

## RECOMMENDATION SYSTEM AND METHOD

### FIELD OF THE INVENTION

- 5 The disclosures made herein relate generally to the field of user recommendation and more particularly relates to a recommendation system and method for recommending co-buyers for the purpose of co-purchasing a property.

### BACKGROUND OF THE INVENTION

- 10 Co-purchasing or co-investing in a property among family members, relatives and business partners is quite common. With the advancement of legal infrastructure and bank facilities the possibility for strangers to come together and co-invest in a property, with or without loan has been enhanced. The main reason for co-purchasing a property is to combine individuals' financial strength i.e. purchasing  
15 capacity, which includes cash savings and borrowing capacity, for owning huge or expensive properties which cannot be bought by such individuals alone. Subsequently, all the participants could own a certain amount of share in the property based on their contribution. However, finding a co-buyer with similar interests among know people is a difficult process.

- 20 Developments were made in the online social networking to bring in buyers with similar interests together for making a purchase. United States Patent Publication No.: US 2014/0108427 A1 discloses a computer-implemented matching service capable of matching users to other users, and/or to user communities, based on a  
25 computer analysis of user affinities for particular items represented in an electronic catalog such as book titles, music titles, movie titles, and/or other types of items that tend to reflect the traits of users.

- Similarly, the research work titled "Co-purchaser Recommendation for Online Group  
30 Buying", by Chen et al., proposes a couple of methods for recommending co-purchasers for purchasing a bulk order of products with better accuracy. However, the conventional methods for recommending co-buyers are not useful when it

comes providing equal opportunity to all the users while avoiding providing too many recommendations.

Hence, there is a need for a recommendation system and method for recommending co-buyers wherein each user is provided with equal opportunity to become a co-buyer irrespective of their purchasing capacity, while avoiding too many recommendations.

## **SUMMARY OF THE INVENTION**

The present invention relates to a recommendation system, comprising multiple buyer devices for inputting buyer information and receiving recommendations and at least one processing unit communicatively connected to each user device for receiving the buyer information for generating recommendations, wherein each recommendation is forwarded to at least two buyer devices. The buyer information includes purchasing capacity and property preferences of a corresponding buyer. At least one grouping module in the processing unit forms at least one virtual group of two or more co-buyers by forming multiple sub-groups of buyers based on the purchasing capacity and selecting at least one buyer from each sub-group to form each virtual group based on the corresponding property preferences.

In one aspect, the grouping module generates an invitation for joining each virtual group as the recommendation and forwards each invitation to at least two buyer devices. The grouping module sets a purchasing capacity range for each sub-group, wherein each buyer with a purchasing capacity within the set purchasing capacity range is automatically added to the corresponding sub-group. The grouping module enables the buyer devices of the co-buyers in each virtual group to communicate with each other through the processing unit.

The present invention also relates to a recommendation method, comprising the steps of:

- i. inputting buyer information at multiple buyer devices, wherein said buyer information includes purchasing capacity and property preferences of a corresponding buyer,
- ii. receiving the buyer information at at least one processing unit that is  
5 communicatively connected to each buyer device;
- iii. processing the received information at the processing unit for generating recommendations, wherein at least one grouping module in the processing unit forms at least one virtual group of two or more co-buyers by:
  - forming multiple sub-groups of buyers based on said purchasing capacity;  
10 and
  - selecting at least one buyer from each sub-group to form each virtual group based on the corresponding property preferences; and
- iv. forwarding each recommendation to at least two buyer devices.

15 In one aspect, an invitation for joining each virtual group is generated as the recommendation at the grouping module and forwarded to at least two buyer devices. A purchasing capacity range is set for each sub-group at the grouping module and each buyer with a purchasing capacity within the set purchasing capacity range is automatically added to the corresponding sub-group. The buyer  
20 devices of the co-buyers in each virtual group are enabled to communicate with each other through the processing unit.

Various objects, features, aspects and advantages of the invention will become more apparent from the following detailed description of preferred embodiments,  
25 along with the accompanying drawing figures in which like numerals represent like components.

## **BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS**

30 In the figures, similar components and/or features have the same reference numerals. Further, various components of the same type are distinguished by following the reference numerals with alphabets that distinguishes among the similar components. If only the first reference numeral is used in the specification, the

description is applicable to any one of the similar components having the same first reference numeral irrespective of the alphabets.

**FIGURE 1** shows a block diagram of a recommendation system, in accordance with an exemplary embodiment of the present invention.

- 5     **FIGURE 2** shows a flow diagram of a recommendation method, in accordance with an exemplary embodiment of the present invention.

## **DETAILED DESCRIPTION OF THE INVENTION**

- 10     In accordance with the present disclosure, there is provided a recommendation system and method for recommending a co-buyer for co-purchasing a property, which will now be described with reference to the embodiment shown in the accompanying drawings. The embodiment does not limit the scope and ambit of the disclosure. The description relates purely to the embodiment and suggested  
15     applications thereof.

- The embodiment herein and the various features and advantageous details thereof are explained with reference to the non-limiting embodiment in the following description. Descriptions of well-known components and processes are omitted so as to not unnecessarily obscure the embodiment herein. The examples used herein  
20     are intended merely to facilitate an understanding of ways in which the embodiment herein may be practiced and to further enable those of skill in the art to practice the embodiment herein. Accordingly, the description should not be construed as limiting the scope of the embodiment herein.

- The description hereinafter, of the specific embodiment will so fully reveal the  
25     general nature of the embodiment herein that others can, by applying current knowledge, readily modify or adapt or perform both for various applications such specific embodiment without departing from the generic concept, and, therefore, such adaptations and modifications should and are intended to be comprehended within the meaning and range of equivalents of the disclosed embodiment. It is to

be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

Various terms as used herein are defined below. To the extent a term used in a claim is not defined below, it should be understood with the broadest definition given by persons in the pertinent art to that term as reflected in publications (e.g. dictionaries, article or published patent applications) and issued patents at the time of filing.

### **Definitions:**

Buyer – A user looking for co-purchasing a property.

- 10 Buyer device – Any mobile device such as smart phone, tablet computer, phablet computer or any other portable communication device capable of being installed with a mobile application, and carried by a buyer.

- 15 Processing unit – A computing device such as one or more remote servers and cloud server environment, capable of wireless communication with mobile devices through internet.

Virtual group – A virtual network of buyer devices connected to each other through the processing unit for communication such as instant message communication, voice calls and video conferencing.

Co-buyer – A buyer who has accepted an invitation to join a virtual group.

- 20 Sub-group – A group of buyers with a purchasing capacity set by the processing unit or who fall under a purchasing capacity range set by the processing unit.

- 25 **FIGURE 1** shows a block diagram of a recommendation system (100), in accordance with an exemplary embodiment of the present invention. The system (100) comprises multiple buyer devices (1) and at least one processing unit (3) communicatively connected to each user device (1). Each buyer device (1) is carried by a different buyer for inputting buyer information to the processing unit (3) and

receiving recommendations from the processing unit (3). Preferably, the processing unit (3) is in the form of a remote server wirelessly connected to the buyer devices (1) through internet.

Each buyer device (1) is registered with the system (100) by inputting any  
5 conventional user registration information such as but limited to name, address, contact number and email address, or by any conventional user registration mentions. Additionally, a buyer information of each buyer is inputted through the corresponding buyer device (1), wherein the buyer information includes property preferences and purchasing capacity. Preferably, the property preferences include  
10 but not limited to property type, style, location, size, rental yield and amenities. In one embodiment, each buyer inputs financial details such as current cash savings available, borrowing capacity of the buyer and the like, and the corresponding buyer device (1) calculates the purchasing capacity from the inputted financial details and transmits the calculated purchasing capacity to the processing unit (3).

15 In a preferred embodiment, each buyer device (1) is a mobile device such as smart phone, tablet computer, phablet computer or any other portable communication device capable of being installed with a mobile application. Furthermore, each buyer device (1) is wirelessly connected to the processing unit (3). Alternatively, each buyer device (1) can be any computing device capable of running a web application,  
20 and the processing unit (3) communicates to the buyer devices (1) through a wired communication network.

The processing unit (3) receives and processes the buyer information for generating recommendations, wherein each recommendation is forwarded to at least two buyer devices (1). At least one grouping module (4) in the processing unit (1) forms at  
25 least one virtual group of two or more co-buyers based on the property preferences. The buyer devices (1) of the co-buyers are enabled to communicate with each other through the processing unit (3).

The grouping module (4) forms two or more sub-groups of buyers based on the purchasing capacity and selects at least one buyer from each sub-group to form  
30 each virtual group based on the corresponding property preferences. In a preferred embodiment, the grouping module (4) sets a different purchasing capacity range for

each sub-group, wherein each buyer with a purchasing capacity within the set purchasing capacity range is automatically added to the corresponding sub-group. Alternatively, the grouping module (4) may cluster the buyers based on the purchasing capacity and convert each cluster as a sub-group of buyers.

- 5     After forming the sub-groups, the grouping module forms one or more virtual group, wherein each virtual group is set with a target value, target number of members and a minimum purchase capacity for each virtual group. Based on the property preferences of each buyer, the grouping module (4) selects at least one buyer from each sub-group with a purchasing capacity range covering the minimum purchase
- 10    capacity, such that the total number of selected buyers and their collective purchase capacity reaches the set target number of members and target value, respectively. The grouping module (4) generates a recommendation for joining each virtual group in the form of an invitation and forwards each invitation to the buyer device (1) of each selected buyer.
- 15    Each invitation includes a control means e.g. URL, for accepting the invitation and another control means for rejecting the invitation. Optionally, an invitation may also include a list of co-buyers already in the corresponding virtual group which is updated each time a co-buyer joins the virtual group until the invitation is accepted/rejected or the invitation is cancelled. In one embodiment, the grouping
- 20    module (4) is capable of including the list of potential joiners of each virtual group and purchasing capacity thereof in the corresponding invitation, such that a recipient of the invitation understands a financial strength of the potential joiners and make better decisions in accepting/rejecting the invitation.

When a number of buyer devices (1) joined a virtual group reaches the

- 25    corresponding target number of members, any pending invitations for joining the virtual group are disabled by the grouping module, wherein the corresponding buyers form the co-buyers in the virtual group. In one embodiment, the buyer device (1) that is first to join the virtual group is made as an administrator of the virtual group. In another embodiment, the buyer device (1) corresponding to the highest
- 30    purchasing capacity among the buyer devices (1) that joined the virtual group is made as an administrator of the virtual group.

The buyer devices (1) that joined a virtual group are enabled to communicate with each other through the processing unit, so that the co-buyers may discuss among themselves regarding individual contribution to purchase price, rights of each co-buyer, share in the property after purchase, termination conditions and the like over a property. Since each sub-group is set with a different purchasing capacity range and members are selected from each sub-group for joining the virtual group, the present invention provides equal opportunity to users of different purchasing capacities but with similar property preferences to come together in purchasing a property, while avoiding recommending each of the buyers with similar purchasing capacities with one another, and thereby minimizing a number recommendations received by each buyer.

If the discussion fails and one or more co-buyers decide to exit the virtual group, a request can be raised at the corresponding buyer devices (1) and the grouping module (4) removes the requested buyer devices (1) from the virtual group, wherein the invitation for joining the virtual group is automatically reinstated by the grouping module (4). Optionally, one or more co-buyers in the virtual group is allowed to invite one or more users not registered with the system (100) to register into the system (100) and subsequently to join the virtual group, when one or more co-buyers exit the virtual group.

Upon completing the discussion, the co-buyers may decide on finalized terms and conditions such as individual contribution to purchase price, rights of each co-buyer, share in the property after purchase, termination conditions and the like, to purchase a property. If any of the co-buyers knows or comes across one or more properties that match with the finalized terms and conditions, the co-buyer(s) may propose the same to others in the virtual group and take proposal for further action. Thereby, the present invention avoids a need to inform each of the registered buyers regarding a property, which may lead to too many unsuccessful enquiries to a property seller or agent and/or may lead to fake demand for the properties.

**FIGURE 2** shows a flow diagram of a recommendation method (10), in accordance with an exemplary embodiment of the present invention. The method (10) comprises the steps of inputting buyer information at multiple buyer devices (11), receiving the

buyer information at at least one processing unit (12) that is communicatively connected to each buyer device, processing the received information at said processing unit for generating one or more recommendations (13) and forwarding each recommendation to at least two buyer devices (14). The buyer information  
5 includes purchasing capacity and property preferences of a corresponding buyer.

The step of processing the received information at the processing unit includes forming at least one virtual group of two or more co-buyers by at least one grouping module in the processing unit. The virtual group is formed by forming multiple sub-groups of buyers based on the purchasing capacity and selecting at least one buyer  
10 from each sub-group based on the corresponding property preferences to form the virtual group.

In a preferred embodiment, a different purchasing capacity range is set for each sub-group at the grouping module, wherein each buyer with a purchasing capacity within the set purchasing capacity range is automatically added to the corresponding  
15 sub-group. Alternatively, the buyers may be clustered by the grouping module based on their purchasing capacity and each cluster is converted into a sub-group of buyers.

After forming the sub-groups, one or more virtual groups are formed at the grouping module, wherein each virtual group is set with a target value, target number of  
20 members and a minimum purchase capacity. At least one buyer is selected from each sub-group with a purchasing capacity range covering the minimum purchase capacity by the grouping module based on the property preferences of each buyer, such that the total number of selected buyers and their collective purchase capacity reaches the set target number of members and target value, respectively.  
25 Subsequently, a recommendation in the form of an invitation for joining each virtual group is generated by the grouping module and forwarded to the buyer device of each selected buyer.

Each invitation includes a control means e.g. URL, for accepting the invitation and another control means for rejecting the invitation. Optionally, an invitation may also  
30 include a list of co-buyers already in the corresponding virtual group which is updated each time a co-buyer joins the virtual group until the invitation is

accepted/rejected or the invitation is cancelled. In one embodiment, the grouping module is capable of including the list of potential joiners of each virtual group and purchasing capacity thereof in the corresponding invitation, such that a recipient of the invitation understands a financial strength of the potential joiners and make  
5 better decisions in accepting/rejecting the invitation.

When a number of buyer devices joined a virtual group reaches the corresponding target number of members, any pending invitations for joining the virtual group are disabled by the grouping module, wherein the joined buyers form the co-buyers in the virtual group. In one embodiment, the buyer device that is first to join the virtual  
10 group is made as an administrator of the virtual group. In another embodiment, the buyer device corresponding to the highest purchasing capacity among the co-buyers of a virtual group is made as an administrator of the virtual group.

The buyer devices of the co-buyers are enabled to communicate with each other through the processing unit, so that the co-buyers may discuss among themselves  
15 regarding individual contribution to purchase price, rights of each co-buyer, share in the property after purchase, termination conditions and the like over a property. Since each sub-group is set with a different purchasing capacity range and members are selected from each sub-group for joining the virtual group, the present invention provides equal opportunity to users of different purchasing capacities,  
20 while avoiding recommending each of the buyers with similar purchasing capacities with one another, and thereby minimizing a number recommendations received by each buyer.

If the discussion fails and one or more co-buyers decide to exit the virtual group, a request can be raised at the corresponding buyer devices and the grouping module  
25 removes the requested buyer devices from the virtual group, wherein the invitation for joining the virtual group is automatically reinstated by the grouping module. Optionally, one or more co-buyers in the virtual group is allowed to invite one or more users not registered with the system to register into the system and subsequently to join the virtual group, when one or more co-buyers exit the virtual  
30 group.

Upon completing the discussion, the co-buyers may decide on finalized terms and conditions such as individual contribution to purchase price, rights of each co-buyer, share in the property after purchase, termination conditions and the like, to purchase a property. If any of the co-buyers knows or comes across one or more properties that match with the finalized terms and conditions, the co-buyer(s) may propose the same to others in the virtual group and take proposal for further action. Thereby, the present invention avoids a need to inform each of the registered buyers regarding a property, which may lead to too many unsuccessful enquiries to a property seller or agent and/or may lead to fake demand for the properties.

The terminology used herein is for the purpose of describing particular example embodiments only and is not intended to be limiting. As used herein, the singular forms "a", "an" and "the" may be intended to include the plural forms as well, unless the context clearly indicates otherwise. The terms "comprises", "comprising", "including" and "having" are inclusive and therefore specify the presence of stated features, integers, steps, operations, elements and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components and/or groups thereof.

The method steps, processes and operations described herein are not to be construed as necessarily requiring their performance in the particular order discussed or illustrated, unless specifically identified as an order of performance. It is also to be understood that additional or alternative steps may be employed. The use of the expression "at least" or "at least one" suggests the use of one or more elements, as the use may be in one of the embodiments to achieve one or more of the desired objects or results.

**CLAIMS**

1. A recommendation system (100), comprising:
  - i. multiple buyer devices (1) for inputting buyer information and receiving recommendations, wherein said buyer information includes purchasing capacity and property preferences of a corresponding buyer;
  - ii. at least one processing unit (3) communicatively connected to each user device (1) for receiving said buyer information for generating recommendations, wherein each recommendation is forwarded to at least two buyer devices (1); and
  - iii. at least one grouping module (4) in the processing unit (1) for forming at least one virtual group of two or more co-buyers by forming multiple sub-groups of buyers based on said purchasing capacity and selecting at least one buyer from each sub-group to form each virtual group based on the corresponding property preferences.
2. The system (100) of claim 1, wherein said grouping module (4) generates an invitation for joining each virtual group as said recommendation and forwards each invitation to at least two buyer devices (1).
3. The system (100) of claim 1, wherein said grouping module (4) sets a purchasing capacity range for each sub-group, wherein each buyer with a purchasing capacity within said set purchasing capacity range is automatically added to the corresponding sub-group.
4. The system (100) of claim 1, wherein said grouping module (4) enables the buyer devices of said co-buyers in each virtual group to communicate with each other through the processing unit.
5. A recommendation method (10), comprising the steps of:
  - i. inputting buyer information at multiple buyer devices (11), wherein said buyer information includes purchasing capacity and property preferences of a corresponding buyer,
  - ii. receiving said buyer information at at least one processing unit (13) that is communicatively connected to each buyer device;

- iii. processing the received information at said processing unit (13) for generating recommendations, wherein at least one grouping module in the processing unit forms at least one virtual group of two or more co-buyers by:
    - 5           - forming multiple sub-groups of buyers based on said purchasing capacity; and
    - selecting at least one buyer from each sub-group to form each virtual group based on the corresponding property preferences; and
  - 10          iv. forwarding each recommendation to at least two buyer devices (14).
6. The method (10) of claim 5, wherein an invitation for joining each virtual group is generated as said recommendation at said grouping module and forwarded to at least two buyer devices (1).
7. The method (10) of claim 5, wherein a purchasing capacity range is set for  
15       each sub-group at said grouping module and each buyer with a purchasing capacity within said set purchasing capacity range is automatically added to the corresponding sub-group.
8. The method (10) of claim 5, further comprising enabling the buyer devices of  
20       said co-buyers in each virtual group to communicate with each other through the processing unit.