

MULTI USER INFORMATION SHARING PLATFORM

Field of the Invention

5 The present invention relates to an information sharing platform. In particular, the present invention relates to an information sharing platform used by multiple users at the same time.

Brief description of the drawings

10 Figure 1a is a schematic diagram showing a multi user information sharing platform according to one embodiment of the present invention.

15 Figure 1b is a schematic diagram showing various subsystems located inside and outside of the platform of Figure 1a.

 Figure 1c is a schematic diagram showing the platform of Figure 1a that communicates with external users (Ux) and their devices.

20 Figure 1d is a schematic diagram showing multiple users using the platform of Figure 1a.

 Figure 2a is a schematic diagram showing a “multi-client to multi-server” framework of the software module of the platform of Figure 1.

25 Figures 2b(i), 2b(ii) and 2c are block diagrams showing functionalities of the software module of Figure 2a.

30 Figures 2d(i) and 2d(ii) are a schematic diagram showing functionalities of the platform of Figure 1a.

Figure 3 is a schematic diagram showing various working modes of the platform of Figure 1a.

Figure 4 is a block diagram showing control of the position-changing mechanism of the platform of Figure 1a.

Figure 5 is a schematic diagram showing a multi user information sharing platform according to another embodiment of the present invention.

Figure 6 is a schematic diagram showing a multi user information sharing platform according to a further embodiment of the present invention.

Detailed Description Of Preferred Embodiments

Personal computers, workstations, mobile devices, monitors and multi-touch-tables are designed for one main person working with them. Data is presented in an orientation that is readable to a single user and inconvenient to others.

Due to display screens being rectangular, the surrounding structure (“wrap-around”) that accommodates the multi-touch-platform is rectangular. This lends users to convene around one edge (usually the longest) and limits the platform to one user per edge.

Collaboration is the act of working with someone to produce something. Collaborative working is being augmented by the use of personal computers mobile devices to create “blended interaction” spaces. In these spaces, digital computing is blended with natural work practices and collaboration. Examples of blended interaction range from digital pen & paper and pen & multi-touch interaction to tangible displays in rooms of mixed or augmented reality.

Collaborative working is a problem solving activity involving at least 2 persons. However any person using their device to explain to others is always exclusively

collaborating with their respective devices while the other users are passive observers. By this nature, working environments are not actually collaborative. This is reflected by poor team performance, inefficient team based problem solving.

5 With the emergence of big data, it is now not possible for an individual to digest the amount of data presented. Greater emphasis is being placed on productive teamwork but current personal and even mobile computing devices have not been designed to support this activity. In such scenarios, team members are again interactive with their respective screens (or part of, in the case of big wall mounted displays) and not with each
10 other.

Our invention includes a graphical user interface (GUI) that allows more than one person around a multi-touch-platform to manipulate the orientation of information that they are reading with a simple hand gesture (“twist”) that does not include pinning the
15 object, specialist programming, and without disturbing other users. Our invention allows users to work along any surface of a horizontal multi-touch-platform.

Our invention is a non-rectangular “wrap-around” structure that allows more users to work around a multi-touch-platform in the form of a table.

20 Our invention is designed to provide a true collaborative multi-touch-based environment where all users are active and share individually acquired information and in a common, centralised forum. Information is simultaneously presented to all users via the multi-touch-platform and discussed, worked on collectively thus significantly improving
25 team performance. Our invention allows for active participation via users being able to swipe data (“swish” files) to and from a common multi-touch-platform. Once the data is presented (“swished”) to the multi-touch-platform, it can be “grabbed” by the user, orientated for reading (i.e. like a paper folder being passed around a board/meeting table). The user can also “swish” the file to their mobile device for working on in their private
30 space (“pull-back”), and then “swish” any worked on documents back to the multi-touch-platform. Whole team reports can be written via the multi-touch-platform and submitted to parties via a network connection.

With the invention of multi-touch mobile devices, there has been a desire to find new ways of communicating in boardrooms and meeting rooms to inspire, motivate and improve team performance. Our invention offers a technologically enhanced, touch-based, boardroom and/or meeting room table. Again, all meeting attendees can connect their mobile devices to the table (multi-touch-platform); “swish” and “grab” files; share worked-on files/new information by “swishing” back to the multi-touch-platform.

Our invention further improves on existing multi-touch-platform based “blended interaction” designs by offering users the following features:

1. Viewing plane is adjustable – where the multi-touch-platform can be flipped from horizontal to vertical position.

2. Height is adjustable, where the platform can be used with sitting, standing, and both standing and sitting (in flipped position).

Our invention includes the following multi-touch-platform based technical innovations:

Software based innovations:

1. Connectivity of multi-touch-platform (i.e. multi-touch-table) to mobile and wearable devices via local area network and/or near-field communication protocols.

Connectivity allows for:

i. Platform to identify number of users, location of users physically around the platform.

ii. Platform to recognise main user preferences.

iii. User to transfer data to and from a platform.

2. “Swish” (finger gesture) - Users being able to transfer data via a swipe finger gesture (“swish” files) to and from a common multi-touch-platform from other multiple touch interfaces (e.g. mobile device, wearables, touch-tables). Once the data is presented (“swished”) to the multi-touch-platform it can be “grabbed” by the user, orientated for reading (i.e. like a paper folder being passed around a board/meeting table). The user can also “swish” the file to their mobile device for working on in their private space (“pull-back”), and then “swish” any worked on documents back to the multi-touch-platform.

3. “Grab & twist” (finger gesture) – GUI where data is presented in an orientation that is readable to multiple users.

Hardware based innovations:

4. Non-rectangular “wrap-around” structure – See below for a projector based system. “Wrap-around” structures are customisable based on multi-touch platform dimensions, shape and orientation.

5. Flip mechanism for converting a multi-touch-platform from horizontal to vertical position. Our mechanism allows for height adjustability, where the platform can be used with sitting or standing. This includes a new way of presenting information in a collaborative way to both seated and standing audiences/users.

Our invention
- Commercial device for Blended Interaction working. Is designed for collaborative working and not digital signage.
- Is a digital boardroom or meeting room table that enables a multi-touch-platform to become a common, shared collaborative space (e.g. like a Roman forum experience).
- Allows users to interact with the platform via their mobile and/or wearable devices.
- Allows users an interface where they can freely orientate information for their own personal use without disturbing others.

- Allows users a new way of presenting information either horizontally or vertically. - Intelligent table that detects users, their locations, and how the users are using the table (i.e. blue – where the users are around the table; green – table on stand-by; red – users actively using the table; etc...); can automatically load user preferences (including automatic log into the table’s personal computer).
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Specific item	Reason
Non-rectangular shape	Current platforms have rounded table-top edges, ours has a deliberately shaved-off edge with a specific angle to allow collaborative working
Flipped design	Orientation of current platforms cannot be changed. Presentation style is thus fixed to horizontal (e.g. tables) or vertical orientations (e.g. wall / hanging installations). Our invention allows for both, and anything in between. This also allows new ways of presenting information to an audience
Imbedded indication lights	Current platforms do not give any indication of status apart from screen being on or off. Current platforms do not tell where users need to stand in-order to interact with it
Better usability (Intelligent multi-touch-platform)	Using near-field-communication protocols, our platform is able to automatically allow the main user to log-into the system, load up pre-set user preferences, and download data for sharing. Additionally, the platform can direct and assign additional user places around the table
Connectivity of multi-touch-platform (i.e. multi-touch-table) to multiple mobile and wearable devices	Current “off the shelf” systems only allow for: 1. PC to PC / Mac to Mac connectivity. Our invention allows a PC based multi-touch platform to stably connect to a Mac based system 2. Mirroring of content to one main screen. Our invention allows for working documents to be sent to a common screen and individual screens. We are not mirroring a main

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Our invention is a flippable, non-rectangular multi-touch interface for collaborative working environment that can be connected to multiple with touch-based mobile interfaces. The multi-touch-interface is a common platform for sharing, examining, and editing digital information. It also serves as a platform to send documents to connected mobile interfaces. It is a common platform for displaying data sent from connected mobile devices.

The platform is accommodated in a non-rectangular table-top (“wrap-around”) which facilitates users to locate themselves around the table with little/no-instruction. The current embodiment is designed to be a 6-sided table-top for 6-users.

The table-top can be designed for the number of users required to interface with the platform (this can be considered an “optional, alternative, additional” feature). For example -, 8-sided table-top for 8-users, etc. With exception for 1 to 4-users where the shape can be custom-made to suite user requirements.

To allow the multi-touch-display surface to be used for either sitting or standing users, it is height adjustable via a motorised mechanism, creating a flexible system.

To allow multi-modal-display of the surface (i.e. horizontal and vertical), there is an additional motorised mechanism that allows the table to be flipped into these orientations. Allowing users to the display data in non-traditional (table-mode) and traditional (flat-screen mode) and any-angle in-between (console-screen mode).

Coupling flipped and height adjustable modes allows users to display and worked-on information in both seated and standing positions.

Due to the shape of the table, user positions are assigned via embedded lighting. Using near-field-communications, the table is able to communicate with the user’s wearable and/or mobile device to detect his/her presence and assign a position around the

table which is indicated via a location light. Embedded lighting is also used to indicate the status mode of the system. For example, status modes are: Off (no lights), On-BLUE (user location), On-GREEN (table ready for use), On-RED (error).

5 Using near-field communications, the main user is allowed to log-into the system and upload his/her user preferences and data files for sharing. The main-user can log-off either manually via the common interface or by placing his/her wearable out of range of the system (drop-out of range automatically logs-out the system).

10 The software components (i.e. code) of our invention are designed based on server-client based applications.

Our software components include the following applications (clients):

Software component	Description
COMMON client	Installed on the table. Allows data to be displayed and worked on in the common multi-touch-platform. Allows data to be orientated to users preferences via “grab and twist” finger based gestures.
MOBILE client	Installed on touch based mobile device. Allows data (and annotations) to be “swiped” to and from the common client.
UPLOADER client	Installed on shared, secure server. Allows data to be uploaded to common client from any site that is connected via the internet to the shared server.
LOCATOR client	ID users, their locations, and upload main user preferences. Also initiates uploader client to automatically upload main user documents.

Other embodiments of the present invention may also include:

Software component	Description
Console system	Table has a fixed tilt-down orientation. Installed software used to control and monitor remote devices.
MOBILE system	Platform runs on a touch-based mobile device. (Figures 5, 6)
Screen-less system	Common multi-touch table platform is replaced with a desk top server like device. That allows data to be directly swiped to other user devices. (Figures 5, 6)

According to one embodiment, the invention (Figure 1a) includes two functional systems – hardware (Figure 1, 3-6), software (Figure 2).

Our hardware system is a non-rectangular multi-touch-table (MTT1) with a non-rectangular table-top with embedded lighting system (i1-i6) that communicates with up to six users (U1-U6) and their external devices (e.g. stylus, mobile touch screens, wearables) located adjacent to the table and remotely to other MTT's (Figure 1a) and other external users (Ux) and their devices (Figures 1a, 1c).

Our system is served by various subsystems located inside and outside of the MTT (Figure 1b).

The multi-touch screen (MTT1) is at least 46" to allow at least 6-users to crowd around it at selected place settings (i1-i6) and interact with the multi-touch-screen (Figure 1d). The screen is a commercially available unit and has at least 10-touch-points (shaded lines – Figure 1d).

The embedded lights (i1-i6) around the edge of the table instruct the user how to place themselves around the table (Figure 1d). For example, a user will come to the table and automatically log-into it via his/her wearable. The user's personal preferences and required documents for that session will be automatically uploaded to the table. A single light located at the table edge will activate instructing where the user should be placed.

Subsequent users log into the table via their wearables, and the appropriate light activated to inform of place setting around the table. User's own mobile device can be used to log into the system if required.

5 More lights that are embedded underneath the table instruct the users as to the table's operational status Figure. For example, no lights indicate table is off; lights on indicate table is operational and standing by for use; lights switches to another colour indicates that table is being used; lights switches to another colour indicates that session is completed.

10 Our software system (Figures 2a to 2d) is based on a "multi-client to multi-server" frame-work (Figure 2a). Software clients are installed on MTT's and mobile devices. Our system is a platform to allow multiple users to fully collaborate with each other via sharing data, collaboration and creating reports.

15 For example (Figure 2b(i)), users can send data to the MTT1 via the uploader client before or "in-real-time" at the working session. The uploader client can be accessed via a user's personal computer and/or mobile device.

20 The locator client (Figure 2b(ii)) improves system usability as it allows the main user to automatically start-up and log into to the MTT (Figure 2c). Where the MTT automatically loads up the main user (U1) preferences and display their files (f1, f2, f3, fn) on the MTT (Figure 2d(i)).

25 The data is displayed to all users crowd around the MTT via the touch-enabled common client installed on the MTT (Figure 2d). Users work on the files (no just limited to x3 files) using primarily the common client (Figure 2d(ii)) and by transferring ("swish" finger gesture) files to their mobile devices.`

30 If the intended user(s) (Ux, U1-6) of that file(s) is not in the same room as the MTT, it can still be "swished" to the remotely connected user (Figure 1c).

Once the data is presented / “swished” to the multi-touch-platform it can be “grabbed” (Figure 2b(ii)) by the users, orientated for reading (i.e. like a paper folder bring passed around a board/meeting table). The users can also “swish” the file (e.g. f2) to their mobile devices (M1) for working on in their private space, and then “swish” any worked on documents back to the multi-touch-platform. Users around the table can “Grab & twist” (finger gesture) files/data/icons presented on the common GUI in an orientation that is readable to that particular user.

Using the same GUI, users can create and send a common Report document (Figure 2d(ii)) based on information/data that has been shared, “cut and paste”, annotated via the platform. This document can then be distributed to all / specific users connected to the table. The report can then be electronically sent to where ever it is required.

Using a motorised flip and height adjustable mechanism (FHM), our multi-touch-table is height adjustable (P1 to P2) to allow sitting and standing user positions (Figure 3(i)).

The table surface can be tilted along a pivot axis (Figure 3(ii)) up to 90 degrees (P1, P3, P4) to allow users to work and display information in conventional console (P3) and wall-mounted display (P4) modes (Figure 3). The motorised mechanism (FHM) is operated by a side mounted push button panel (Figure 4).

One variation could be: All or part of the table can be tilted (“flipped”) as required by the user(s). For example seated users may want to work on a horizontal component of the table while simultaneously presenting their work to standing up users.

One variation could be: System can be reduced in size to two self-contained foot-prints (versions): Mini version (Figure 5) that is no bigger than a mobile table; Micro version (Figure 6) that is no bigger than a quarter of mobile table where the common touch screen is replaced by user indication lights (i1-i6). Both version will be mobile, light-weight and battery powered.

Although embodiments of the present invention have been illustrated in conjunction with the accompanying drawings and described in the foregoing detailed description, it should be appreciated that the invention is not limited to the embodiments disclosed. Therefore, the present invention should be understood to be capable of numerous rearrangements, modifications, alternatives and substitutions without departing from the spirit of the invention as set forth and recited by the following claims.

CLAIMS

1. An information sharing platform comprising:

a display unit;

5 a software module coupled to the display unit for controlling the display unit.