

CLAIMS

What is claimed is:

1. A system for providing decision support based on scratch events, the system comprising: a processor; and a computer memory having computer executable
5 instructions stored thereon for performing operations when executed by the processor, the operations comprising: receiving accelerometer data for an individual; detecting a hand movement utilizing the accelerometer data; utilizing a computerized classification model to determine, based on the accelerometer data corresponding to the hand movement, that the hand movement indicates a scratch event; and initiating one or more response actions based at least
10 on a determination that the hand movement indicates the scratch event.
2. The system of claim 1, wherein the operations performed by the processor executing the computer executable instructions further comprise: generating a multidimensional timeseries from the accelerometer data corresponding to the hand movement; and determining a plurality of feature values from the multidimensional timeseries, the plurality
15 of feature values including at least one time-domain feature value and at least one frequency-domain feature value, wherein the determination that the hand movement is the scratch event is based on the plurality of feature values.
3. The system of claim 1, wherein the accelerometer data is captured by a wearable device located at an appendage of the individual.
- 20 4. The system of claim 1, wherein the operations performed by the processor executing the computer executable instructions further comprise determining a total sleep opportunity based on the accelerometer data, the total sleep opportunity comprising a period of time between when the individual lays down for a rest and when the individual gets

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up from the rest, wherein the hand movement is detected utilizing accelerometer data corresponding to the total sleep opportunity.

5. The system of claim 4, wherein the accelerometer data is captured by a wearable device having a plurality of sensors, wherein the wearable device further captures at
5 least one of near-body temperature data and light data, the total sleep opportunity being determined further based on the at least one of near-body temperature data and light data.

6. The system of claim 1, wherein the computerized classification model utilized to determine that the hand movement indicates the scratch event comprises at least one of an ensemble of machine learning models and a random forest classifier.

10 7. The system of claim 1, wherein the one or more response actions comprises generating a graphic user interface element provided for display on a user device, the graphic user interface element including at least one of: an indicator of one or more scratch endpoints comprising a total number of scratch events and a total scratch duration; and an indicator recommending that the individual seek clinical consultation based on the
15 determination that the hand movement indicates the scratch event.

8. The system of claim 7, wherein the total number of scratch events and the total scratch duration are each determined for a total sleep opportunity that is determined based on the accelerometer data received for the individual, the total sleep opportunity comprising a period of time between when the individual lays down for a rest and when the
20 individual gets up from the rest.

9. A method for treating pruritus utilizing, a motion sensing device associated with a subject, the method comprising: receiving accelerometer data collected from the motion sensing device; detecting a hand movement utilizing the accelerometer data; utilizing a computerized classification model to determine, based on the accelerometer data
25 corresponding to the hand movement, that the hand movement indicates a scratch event; and

based on at least a first determination that the hand movement indicates the scratch event, initiating a treatment protocol for the subject to treat pruritus.

10. The method of claim 9, wherein initiating the treatment protocol is further based on a plurality of determinations that a plurality of hand movements each indicate
5 a scratch event, and wherein initiating the treatment protocol includes determining at least one of a therapeutic agent, a dosage, and a method of administration of the therapeutic agent.

11. The method of claim 10, wherein the therapeutic agent is selected from the group consisting of: infliximab, adalimumab, belimumab, tanezumab, ranibizumab, bevacizumab, mepolizumab, certolizumab, natalizumab, ustekinumab, vedolizumab, 6-
10 mercaptopurine, hydroxychloroquine, obeticholic acid, mofetil, sodium mycophenolate, leflunomide, rituxan, solumedrol, depomedrol, betamethasone, prednisone, cyclosporin, tacrolimus, pimecrolimus, dupilumab, omalizumab, tralokinumab, etokimab, nemolizumab, Tezepelumab, lebrikizumab, fezakinumab, anti-OX40, efalizumab, etanercept, crisaborole, fluocinonide, mapracorat, hydrocortisone, desonide, alclometasone, triamcinolone,
15 desoximetasone, loratidine, fexofenadine, desloratidine, levocetirizine, methapyrilene, cetirizine, budesonide, fluticasone, mometasone, dexamethasone, prednisolone, ciclesonide, beclomethasone, methotrexate, azathioprine, aspirin, ibuprofen, celecoxib, valdecoxib, WBI-1001 and/or MRX-6, abrocitinib, baricitinib, brepocitinib, cerdulatinib, decernotinib, delgocitinib, fedratinib, filgotinib, gandotinib, ilginatinib, itacitinib, lestaurtinib, momelotinib,
20 oclacitinib, pacritinib, peficitinib, ritlecitinib, ruxolitinib, tofacitinib, upadacitinib, THRX-212401, PF-07055087, PF-06471658, PF-07055090, ATI-502, BMS-986165, JTE052, PF-06826647, SNA 152, SHR-0302, tapinarof, and/or alitretinoin.

12. The method of claim 10, wherein the therapeutic agent is selected from the group consisting of: crisaborole and abrocitinib.

13. The method of claim 9, wherein initiating administration of the treatment protocol includes generating a graphic user interface element provided for display on a user device, the graphic user interface element indicating a recommendation of the treatment protocol that based on the first determination that the hand movement represents the scratch
5 event.

14. The method of claim 13, wherein the user device is separate from the motion sensing device, and wherein the motion sensing device comprises a wearable device worn at an appendage of the individual.

15. The method of claim 13 further comprising applying the treatment
10 protocol to the subject based on the recommendation.

16. The method of claim 9, wherein the subject is diagnosed with atopic dermatitis based on the determination that the hand movement indicates a scratch event and wherein the treatment protocol is to treat atopic dermatitis.

17. One or more computer storage media having computer-executable
15 instructions embodied thereon that, when executed by one or more processors, cause the one or more processors to perform operations comprising: receiving accelerometer data for a subject; and causing for display, on a user device, one or more scratch endpoints for the subject based a determination that one or more hand movements detected from the accelerometer data indicate scratch events.

20 18. The computer storage media of claim 17, wherein the accelerometer data is received from one or more sensors integrated into a wearable device that is communicatively coupled to the user device.

19. The computer storage media of claim 17, wherein the accelerometer data is captured by sensors integrated into a first wearable device and a second wearable device
25 worn contemporaneously by the subject.

20. The computer storage media of claim 17, wherein the operations further comprise causing to display, on the user device, a treatment protocol for the subject for treating atopic dermatitis, the treatment protocol being based on the one or more scratch endpoints.