INFINITY | Comfort

OFFICIAL PROJECT PROPOSAL

ECE 150 – 001

TEAM NAME:
Infinity Comfort

TEAM MEMBERS:
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TEAM NUMBER:
#39 - Team Number

PROJECT DESCRIPTION:

The 'Infinity Cushion' will be a device to provide valuable analytical and experience-based data to a user as they sit at their desk and work over a given interval of time. The device will be implemented as a 'connected-cushion', such that it is used when the user is sitting down and studying, or in other states of focus. The cushion will use a combination of sensors, as a connected display that the user places anywhere on their desk to analyze motion and deviations in vibrations over the study period for which the person is working. The results from the sensors in the system will be stored and analyzed against functions that are developed to match the greatest regression factor(ex: linear regression plot), and at a given period, when the user desires, providing a well-formed summary and report of their studying pattern and focus over their selected interval, enabling the user to optimize study focus. Such a summary will be deliverable in the form of a human-readable link and/or document. The intended user is a student/studying individual, and the inspiration behind the design's model is a university student optimizing their studying abilities so that they are able to achieve the greatest level of focus while working at their desk.

From a software perspective, the data provided from the sensors in the cushion/device as well as the simple input from the button to start/stop studying at the screen will be written to a file, which is then processed immediately by polling it along a predetermined interval that matches the average study period for the particular time. All sensor data will serve as a functional layer of files in our software structure. The data written to a file will then, according to our predetermined interval, be run against the aforementioned functions to signify when the greatest motion over a period of time occurred, periods at which no motion was detected, as well as other minor parameters and oddities based on reasonable assumptions (ex: small motions not considered, as within certain percentage error for general human motion). Such statistical analysis will be ported from the functional layer to the analytical layer of our software structure, and further be transferred as a last step, to our output layer. The statistical data will then be processed into an output file, which the user can access via I/O through either the web or USB and view their respective report while being able to save their data for future reference.

TABLE #1: REQUIRED EQUIPEMENT

Component	**Justification for Use**	**Count**	**Source of Acquirement** *Includes Estimated Delivery Time*	**Cost**
LCD Display	Output valid information to user	1	https://www.adafruit.com/product/181 OR http://www.robotshop.com/ca/en/16x2-character-lcd-display-white-blue-5v.html (1 Week or Less)	$10.75 - $12.75
Piezoelectric Disk	Vibration Detection in Cushion	4	Digikey https://www.digikey.ca/product-detail/en/murata-electronics-north-america/7BB-15-6L0/490-7800-ND/3863486 (Required 1 Week or Less)	$4.94

TL082 Opamp	Amplifiers Required for Signal Data with Piezoelectric Disk	3	Digikey https://www.digikey.ca/product-detail/en/texas-instruments/TL082IP/296-1781-5-ND/277426 OR any major parts distributer. (Required 1 Week or Less)	$3.03
LM339 Comparator	Signal Processing	3	Digikey https://www.digikey.ca/product-detail/en/texas-instruments/LM339AN/296-6605-5-ND/372806 (Required 1 Week or Less)	$1.68
Push Button	User Confirmation I/O	2	https://www.sparkfun.com/products/11992 (Required Immediately)	$2.45
Force Sensitive Resistor	Detection of Weight on Cushion	1	DigiKey https://www.digikey.ca/product-detail/en/interlink-electronics/30-49649/1027-1000-ND/2476465 (Required 1 Week or Less)	$10.50
LM334 Adjustable Current Source	Biasing of Force Sensor	1	Digikey https://www.digikey.ca/product-detail/en/texas-instruments/LM334Z-NOPB/LM334ZNS-NOPB-ND/6215 (Required 1 Week or Less)	$1.27
Power Bank	Powering Omega 2	1	Will Be Provided by Us. (Required Immediately)	$0.00
Misc. Passive Components (resistors, capacitors)	Circuitry	--	Rigidware Store Can Be Purchased by us on a Need-Based Schedule, or Provided by Project Coordinators. (Required Immediately)	--
Cushion	Apparatus for Sensors	1	Will Be Provided By Us (Required 1-2 Weeks)	$5-10
Omega 2 & Associated Dock	Central Embedded Processor	1 (Set)	Provided by Project Coordinator (Currently in our Possession)	$0.00
Total	**---**	**18 Parts**	**3 Major Suppliers**	**$31**

*Note: Cost of Cushion Will Be Covered By Us.

END OF OFFICIAL PROJECT PROPOSAL.

Please note that this document is the Official Project Proposal for the ECE150-001 Final Project. All details and sources for parts have been cross-checked for greatest availability and lowest relative cost. All changes from the Initial Project Proposal to this document reflect a combination of the feedback we received via Dropbox as well as discussions with our group and Prof. Ward.