**Final 3rd year Project Proposal**

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| Project title | Internet of Things for healthcare applications – mental well-being |
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| Supervisors | Nathan Gomes |
| Date | 17/10/2021 |

# Brief project description

# This project aims to study the use of Internet of Things (IoT) technology to monitor vulnerable people, to detect their mental health condition through continuous monitoring sensors. For example, use smartwatches to measure the heartbeat for stress prediction, and use motion sensors or microphones for sleep quality analysis. Using suitable algorithms to identify abnormal patterns and to communicate this message to healthcare organizations and the end users at a timely manner, based on the level of the emergency.

# Goals and objectives

1. To find appropriate datasets for abnormal behaviour detection.
   1. To define the specific behaviour to be monitored.
   2. To select measurable physical data.
2. To develop a model for abnormal behaviour detection.
   1. To select several models(algorithms) based on the selected dataset’s nature.
   2. To train the model to get the accuracy.
   3. To compare the results and make a decision.
3. To specify the whole monitoring procedure.
   1. To determine the frequency of data collection and notifications.
   2. To define the priorities of the warning.

# Bibliography

1. D. C. Yacchirema, D. Sarabia-JáCome, C. E. Palau and M. Esteve, "A Smart System for Sleep Monitoring by Integrating IoT With Big Data Analytics," in IEEE Access, vol. 6, pp. 35988-36001, 2018, doi: 10.1109/ACCESS.2018.2849822.

This paper shows one way to monitor sleep using snoring level and heart rate.

1. P. Kumar, R. Chauhan, T. Stephan, A. Shankar and S. Thakur, "A Machine Learning Implementation for Mental Health Care. Application: Smart Watch for Depression Detection," 2021 11th International Conference on Cloud Computing, Data Science & Engineering (Confluence), 2021, pp. 568-574, doi:10.1109/Confluence51648.2021.9377199.

This paper indicates the heartbeat is related to stress level, accurate predictions can be made by algorithms.

# Project schedule



# Failure risks

This project is mainly about data analytics, which is not covered by the department’s courses, there might be several failure risks associated. First, lack of adequate volumes and quality of training data remains a significant development challenge. In this case, student should talk to supervisors to adapt the project focus a little to match what is available. Second, Python might be difficult to master and lead to the failure therefore taking relevant courses online might be a possible solution. Third, since the whole project is virtual, if the computer is broken, the whole project might be unable to recover. Cloud backup might be used to mitigate this problem.

# Safety risks

Table

Description automatically generated

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| --- | --- | --- | --- |
| **Activity** | **Hazard** | **Control** | **Risk level with control measure in place Severity x Likelihood** |
| Working with computer | Display screen equipment  Display lighting and room lights  Anxiety/stress | Workstation and equipment set to ensure good posture and to avoid glare and reflections on the  screen.  Check the lighting level and discuss with IT support.  Students can talk to supervisors if they are feeling unwell or at ease about things at work. | Low |