### HCT2017/1A Understanding power distribution in block chains: an empirical study

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**Project Description:** Block chains have emerged as a globally distributed phenomenon - first for cryptocurrency and now increasingly for distributed applications. The real-world implications for regulatory actions are profound; yet there is a disturbing lack of empirical data to guide us. We have built the Blockchain Observatory in response to this: the world’s first large-scale observatory of blockchain users and usage. In this work, you are going to work with data sets we have to answer the following questions:

- Where are blockchain users located?
- Where are other power factions, such as mining pools, exchanges, and developers located?
- How does the distribution of power in blockchains map out?

Depending on the skills and interests of the candidate, this project can be tweaked more towards the technical side.

### HCT2017/2A EaT app

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**Project Description:** In order to provide feedback to individuals or to their health professional in ways that are meaningful we would like to create a user dashboard, which the user can feed data, for storage and review. This dashboard can give feedback on nutrient intakes and/or food group intakes and could incorporate comparisons with recommended intakes and suggestions for improving diet quality. This project will conceptualise and evaluate a the dashboard using human-computer interaction methods.

### HCT2017/3A Immersive virtual reality exergames

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**Project Description:** Exercise is important for health and well being. However, for some people it can be hard to find the time or motivation to get the recommended amount every day. Virtual reality exergames have been demonstrated to provide high levels of exertion compared to traditional exercise, while players perceive less exertion. However, while VR exergames are effective at delivering exertion and motivating people to exercise, they have the potential to over- or less-exert people as they lack detailed information about the player’s level of exertion.

Therefore, the aim of this project exploration of designing a personalised VR exergame that changes game characteristics while playing based on the player’s exertion levels and game play performance. Also, they could potentially design and build a dashboard that enables people to review and reflect on their physical activity from game play.
Skills required:
- Intermediate Programming skills (We primarily use the Unity game engine, C#, Python, JavaScript, and HTML).
- VR and/or game development experience preferred but not compulsory.
- Whoever interested in this area and would like to learn about it more.

Developmental outcomes for student:
- Software that can be used from others.
- Exposure to high impact research, scientific expertise in multiple disciplines, and scientific infrastructure.
- Experience in building a long term personalisation framework and interfaces.
- Improved skills in scientific communication (e.g. writing scientific reports and oral presentations).
- Potentially work on the academic paper

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<th>HCT2017/4A Data Mining and Interfaces for I-Engage - Visualisation and Interface Design</th>
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<td><strong>Primary Supervisor:</strong> A/Prof Kalina Yacef [<a href="mailto:kalina.yacef@sydney.edu.au">kalina.yacef@sydney.edu.au</a>] - School of Information Technologies; A/Prof Corinne Caillaud [<a href="mailto:Corinne.caillaud@sydney.edu.au">Corinne.caillaud@sydney.edu.au</a>] - Charles Perkins Centre; Dr Olivier Galy - University of New Caledonia</td>
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Non-communicable diseases (NCD), including cardiovascular diseases and type 2 diabetes, are a major cause of deaths (75%) in the Pacific Islands countries. The i-Engage project aims at reducing the incidence of NCDs through increased physical activity and healthier food choices. I-Engage is a multicomponent intervention, supported by an online education platform, providing high school students with engaging learning activities, sensing devices and a team challenge to improve their health literacy with regards to physical activity and food choices, and engage them in goal setting and self-monitoring. The main research project partners are the University of Sydney and University of New Caledonia in collaboration with two NSW industry partners.

This project will consist in creating a set of intuitive interfaces for various end-users (such as program directors, public health researchers, school directors, parents and children) ranging from simply monitoring progress to visualising cohorts’ results and elaborating some mining and statistical queries.