MSc Theses Proposals by Paulo Ferreira

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  - https://www.mn.uio.no/ifi/english/people/aca/paulofe/index.html

- MSc theses will be done at UiO / PSE

- Do you have your own suggestions? Let´s talk !

- More information:
  - come to room 10460 and we have a chat
  - send me an email: paulofe@ifi.uio.no

- Requirements:
  - good tracking record (grades, courses), enthusiasm, and commitment.

- MSc themes:
  - Java Virtual Machine
  - Ubiquitous/Mobile Systems
  - Distributed Systems
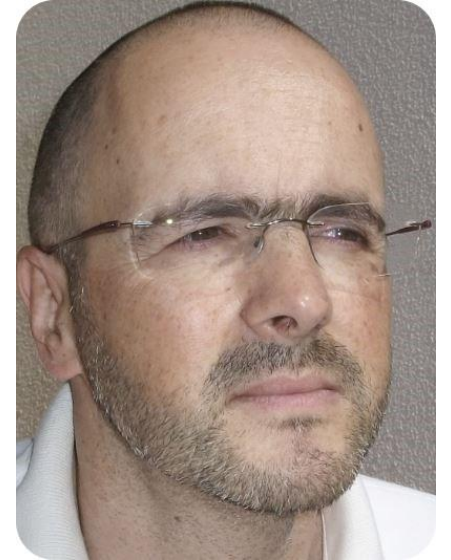
GCperf – Performance Comparison of GC for Big Data Environments
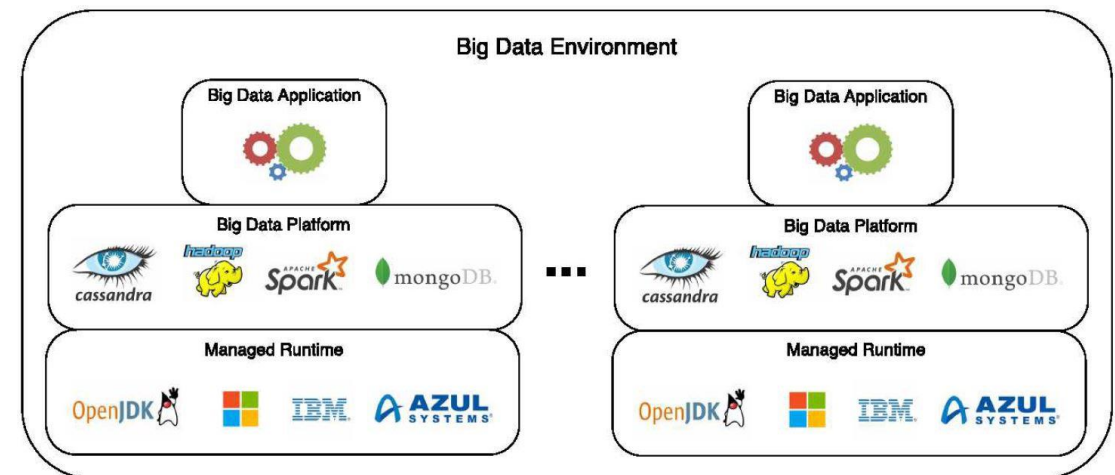
- **Background:**
  - Clear need for efficient data processing from a large number of Big Data applications in several areas (e.g. network analytics and visualization, credit card fraud detection, etc.).
  - There are several big-data platforms (BGPATs) that are instrumental for the success of such applications.
  - **A very relevant problem** is related to the Garbage Collection (GC) in such Java-based platforms.

- **Goal:**
  - Analyze and evaluate several modern GCs that have been recently developed for the JVM (e.g., PS, G1, NG2C, ZGC, Shenandoah, and C4).
  - The study will focus, among other fundamental aspects, on trade-offs offered by each GC (e.g., throughput and latency).
  - The evaluation will be done using a set of well-known, representative, and freely available benchmarks.

- **Requirements:**
  - Enjoy and have adequate skills to deal with low-level system issues related to Java, JVM and Linux.

# DetectBiklio – Detect Bicycle Usage with a Smartphone app

- **Background:**
    - Biklio (https://www.biklio.com/) is a smartphone app (Android and iOS)
      that promotes cycling (https://www.youtube.com/results?search_query=biklio)
    - It transparently monitors your transport modality.
    - When Biklio is confident you've been cycling, you are eligible for a shop benefit.
    - Then, you just go to a shop, show Biklio display and you'll get a benefit.
    - Additionally, you can also record your cycling routes (claim special benefits).
    - **One difficulty** lies with the correct detection of the transport mode.

- **Goal:**
    - Develop a module based on: i) the most recent Activity Recognition API provided
      by Google (https://developers.google.com/location-context/activity-recognition/),
      and ii) a machine learning based solution.
    - Design, implement, and evaluate both approaches.

- **Requirements:**
    - Enjoy and have adequate skills to deal with Java, Android, and mobile system issues.
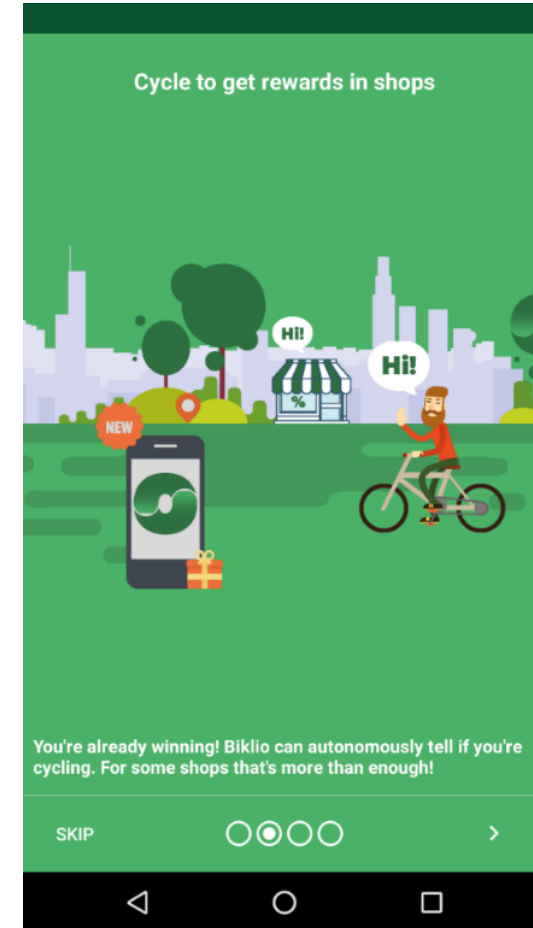
# DetectP2P – P2P Detection of Travel Mode

- **Background:**
  - Each smartphone runs an application (app) that detects the transport used.
  - Each smartphone uses a simple stand-alone machine learning algorithm.
  - **A difficulty** is the small amount of information available for the machine learning algorithm to reach high-confidence results.

- **Goal:**
  - Take advantage of other smartphones thus using several in a P2P network.
  - For a P2P environment: develop a smartphone app module that, based on individually collected mobility data but in cooperation with other peers, detects a user's mode of transportation.
  - The peers, once discovered, create a network to share the data that has been collected, the detection itself, and any other information that may be useful for the purpose.

- **Requirements:**
  - Enjoy and have adequate skills to deal with Java, Android, and mobile system issues.
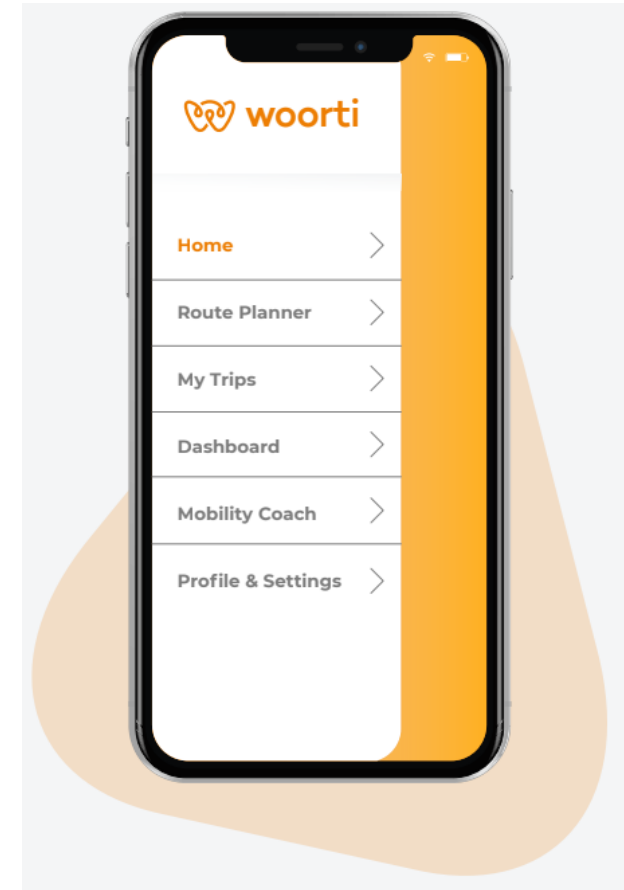
Termite – Supporting Encounter Based Apps

- **Background:**
  - Encounter based mobile applications (apps) are now possible.
  - **A problem** is the difficulty when developing such "encounter-based" apps (e.g., number of devices, paths, debug, etc.).

- **Goal:**
  - Design, implement and evaluate Termite to support the development for Android.
  - Improve the current version of Termite.
  - It is based on the used of several VMs in the cloud.
  - Each VM emulates a smartphone, and each one moves according to an easy to specify path.

- **Requirements:**
  - Enjoy and have adequate skills to deal with Java and Android.

VfcShareLatex - Efficient Consistency for Cooperative Latex Edition

- **Background:**
  - Collaborative writing tools are widely used and available
    (e.g.Overleaf, ShareLatex - https://www.sharelatex.com/).
  - **A problem** is the speed at which "userA" sees the changes that "userB" has done
  - Thus, there are several consistency protocols that can be used for that purpose.
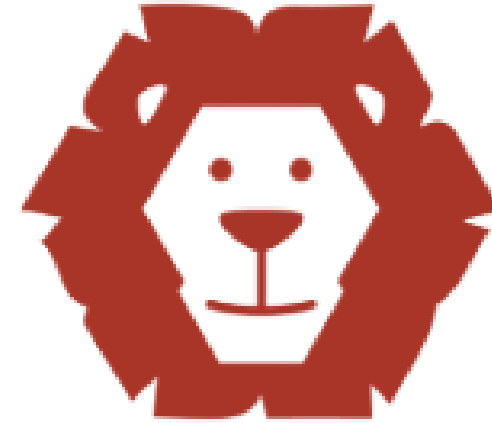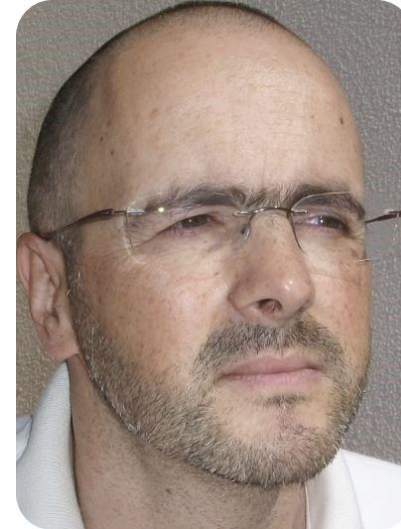
- **Goal:**
  - Design a module based on the consistency protocol called Vector Field Consistency (VFC)
    (https://link.springer.com/chapter/10.1007/978-3-540-76778-7_5).
  - VFC allows updates to different parts of a document to have different priorities (e.g., depending on the relative interest of the user in the region in which the update is performed).
  - Implement and improve the current version of VFC and integrate with ShareLatex.
  - Evaluate the protocol VFC in ShareLatex.

- **Requirements:**
  - Enjoy and have adequate skills to deal with Linux and JavaScript.

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