**Daily Log Project M.Sc. ECMM510**

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**Project Name: Change Detection for protecting UNESCO World Heritage**

**Internal Supervisor: Dr. Milto Miltiadou**

**External Supervisor: Athos Agapiou**

**Daily Log of Activity**

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| Date | Activity | Outcomes | Comments |
| *14/01/2025 (Pre)* | *MSc Research Project Introduction Seminar* | *Initial exploration and shortlisting of potential projects to go towards – Introduction to main project deliverables and deadlines* | *Noticed a few projects with the UNESCO project specifically standing out as the most interesting to pursue.* |
| *16/01/2025 (Pre)* | *Project Inquiry and Supervisor Approval Meeting* | *Approval to be on the project* | *Had an initial meeting with Milto, during which I received approval to join the project.* |
|  |  | Project Starts |  |
| 03/03/2025 -13/03/2025 (Week 1-2) | Initial Exploration into UNESCO world heritage sites and urbanism and its impacts | Explored related literature gaining a general understanding of a few potential directions this project can go in – with a primary outcome of UNESCO sites being divided into 3 categories that would majorly set the direction of the project: these being Natural Sites, Cultural Sites within Urban Areas, and Cultural Sites outside Urban Hubs.   More on related literature:  - Exploration into how monitoring is performed, with Landsat, Sentienl-1/2 were also compared - Exploration on Land Use Classification and Land Use Change were briefly explored. | This gave a good initial introduction towards the project and directions to explore; from reading the literature it was found that it would be best to look in the direction of exploring urban expansion towards sites outside of (or close to but not within) urban hubs – as this is where monitoring this threat would likely be most valuable.   Whereas sites within urban hubs a more pro-active approach towards designs and planning would be more affective – and in the case of this project being remote sensing it would only be post- or mid- construction that this project would notice any changes, as such would be less valuable. |
| 06/03/2025 (Week 1) | Initial Group Meeting *(Weekly Meeting)* | Initial Meeting officially kickstarting the project and started project proposal. | N/A – introduction to others, with useful brief discussions towards each of our projects. |
| 13/03/2025 (Week 2) | Initial Meeting with Athos | Further introduction to project, incredibly useful as this opened the direction the project can take. | Incredibly useful meeting for my understanding of the importance of project like this one – one key takeaway was the mention of how remote sensing for monitoring inaccessible sites such as those within warzones/similar. |
| Meeting for Project Proposal Outline *(Weekly Meeting)* | A draft outline for the project proposal was created, with recommendations on | N/A |
| 18/03/2025 (Week 3) | Google Earth Engine Lecture | Further introduction to Google Earth Engine (GEE). | Very useful to understand the kind of that that I will be dealing with.   This gave me an initial understanding of direction for data collection. However, I don’t know JavaScript, and it’s also far more limited in terms of data manipulation, so the Python API would be a better path to pursue for greater versatility later. |
| 21/03/2025 (Week 3) | Discussion on Site Selection and later data collection *(Weekly Meeting)* | Discussion on site selection, and polygon selection around sites for PlotToSat and then ML (for project pipeline). | No site was selected this week; some exploration had taken place however this did not yield any results – as per looking for sites that had significant changes within the urban landscape in their surroundings. |
| Site Exploration | Focused on using easily assessable tools at this point, such as *Esri | World Imagery Wayback* and manually checking, however this was tedious an slow. | This was too tedious, so need to find a more elegant solution that allows for checking the UNESCO sites quicker. |

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| 24/03/2025 (Week 4)  27/03/2025  28/03/2025 | Site Exploration with GEE and GEEMAP tools | Created a tool to aid in site exploration where I would take the site locations from the UNESCO  Explored sites initially around the Levant, 1 site in Crete and looked at pins within Romania, the UK and little bit within Spain – mainly stuck to looking at the Levant at first though however a site with large scale changes (excluding Palestine) were not really spotted.   Further exploration into the neighbouring countries – Egypt (briefly) and Iraq (heavily) identified a site in Smarra containing what I can assume to be older parts of the city and palaces from the Abbasid Caliphates (from approx. ~800s). | Would personally like to look more into the ancient cities within the area however, those appear to mostly be out of the way of Uran Areas or only have minor activity around them (excluding Ur. Where there is an airport right next to it. A day to perform further exploration would be nice – but might not be possible until the 7th of April as the project needs to move on)   A simple version of tiling was achieved but more as a coincidence while trying to load the images faster- was achieved by creating multiple tasks for GEE by tiling then requesting those segments as separate tasks then collating the image – no further exploration has been done as it was not useful to the aim of site exploration.   Initial exploration on ‘S2’ but moved to ‘S2\_HARMONIZED’ as there was less variety in image intensity (brightness) – used B4, B3 and B2 bands (RGB) |
| Group Meeting focusing on the Ethics and Risk Assessment for the project proposal.  *(Weekly Meeting Pt.1)* | Discussion on Risk assessments within the Project Proposal. A need for feasibility for parts of the project and where to move onto (contingencies) if parts do not work out as planned. | “FAIR” – Findable Accessible, Interoperable and Reusable.  Deliverables – actual deadlines for this project + parts of the project (that will be made open source)  Risk for project being noise in the data causing potential misclassification – contingency is to increase the resolution (larger polygon) so that the classifier becomes more accurate. |
| Codebase expansion – explore using polygons to collect region | Added ability to select time-span and date for selected polygons on `geemap` to collect and view for comparisons. This greatly expanding my ability to search around sites rather than it collecting just the surroundings around a UNESCO site point. | This allowed to further explore the surrounding areas of sites, Samarra is still the best choice up to this point.  This gives me a way greater |
| Meeting to discuss site findings and further discussion on creation of a project pipeline. *(Weekly Meeting Pt.2)* | Site at Smarra selected as primary site of interest. | Samarra Archaeological City, due to the scale of this site, only this site is going to be selected rather than multiple smaller sites, as it has a bunch of monuments in account of it being a mostly abandoned ancient city.   Project pipeline for the project proposal is now the next area the needs to be progressed. |
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