Advanced Computer Networks and Operating Systems

Coursework Task
Contact: Soufiene Djahel, s.djahel@mmu.ac.uk, 0161 247 1522 or Mohammad Hammoudeh, M.Hammoudeh@mmu.ac.uk, 0161 247 2845. Marked out of 100, worth 40% of the marks for this unit.

For this task, you are required to select a topic of current interest in Computer Networks *or* Operating Systems research (within constraints – see below) and produce a survey of recent research on this topic. You are also expected to prepare a short presentation on this topic at the end of term.

Learning Outcomes

This task is designed to assess the following learning outcome for this unit:

> *Research and critically reflect upon current challenges and future technological trends in the fields of computer networking and operating systems.*

The details of how this will be assessed are given in the marking rubric at the end of this document.

Task Description

Your task is to produce a survey paper to explore and critically analyse the state of the art work currently being done in a specific area of computer networks or operating systems. According to [ACM Computing Surveys](), a survey paper is defined as "A paper that summarizes and organizes recent research results in a novel way that integrates and adds understanding to work in the field. A survey article assumes a general knowledge of the area; it emphasizes the classification of the existing literature, developing a perspective on the area, and evaluating trends."

The survey paper should have the following structure:

- Title
- Author
- Abstract
- Introduction
- Survey body: Your **critical analysis** of research in this area
- Gaps and opportunities
- Conclusion
- References

Detailed guidance on researching and developing a survey paper will be provided in class.

Choosing a Topic

You are required to pick a specific area of research *either* in the IoT networking domain *or* related to operating systems for cloud computing.

For IoT, the topics to choose from are:

- System architecture such as things-centric, data-centric, service-oriented IoT architectures;
- Communication and networking protocols;
- Enabling technologies and systematic integration such as sensor technologies and future Internet design for IoT;
- Services, applications, deployments and test-beds such as IoT service middleware and management platforms;
- Standardisation activities and technology development in different standard development organizations (SDO) such as IEEE, IETF, ITU, 3GPP, ETSI, etc.
- IoT security such as authentication, privacy, access control, PKIs, etc.

If you wish, you may choose another IoT- or networking-related topic, but you **must** get approval from Mohammad Hammoudeh for this.

For operating systems and cloud computing, the topics to choose from are:

- Data Flow Management and Load Balancing
- Energy conservation
- Security and privacy issues
- Managing data availability
- Mobile cloud computing
- Cloud network architectures
- Cloud Networking in 5G
- Fog computing
- Edge computing
- Network Functions Virtualization (NFV)

If you wish, you may choose another topic related to operating systems and cloud computing, but you **must** get approval from Soufiene Djahel for this.

When selecting a topic, you will need to consider its *scope* carefully. Choosing <u>too narrow</u> a scope will make it difficult to find a <u>sufficient range</u> of papers on the topic, while choosing <u>too wide</u> a scope will make it difficult to provide <u>adequate coverage</u> of the related research in the space limit given. You might find, during the course of your research, that you need to broaden or narrow the topic that you have chosen – you should discuss this with staff if need be.

Your Paper

Your paper should provide a survey of the state of the art research on the topic of your choice. Your work should be appropriately referenced, using the ACM referencing style. Time will be set aside in classes on the 10th October to discuss the development and structure of your paper, and a draft should be prepared for formative feedback in class on 24th October. A second formative feedback on your final paper will be given in-class on week commencing 26 November.

Your paper should be 8-12 pages long, including any figures and bibliography. Margins, fonts, headings, etc. should follow the formatting rules given in the ACM SIG proceedings templates (ACM, 2017). This type of instruction is typical for submission of papers to academic and professional workshops and conferences, rather than a word limit specification.

Your survey should cover research published in the last **five** years, preferably in the last **three** years. Older publications are generally only accepted in sections other than the survey body. You are expected to cover a minimum of eight papers in the survey body.

Your Presentation

All students will be expected to prepare a presentation of their work, to be presented to the class in the final week of term (Wednesday 12th December 2018). The presentation length should be <u>15 minutes</u>, which will be followed by a <u>5-minute</u> period in which you should respond to questions.

Seminar sessions that are held throughout the first half of term will provide you with examples of how you could present your work, and an opportunity to practice your own presentation skills (and receive feedback).

Submission and Presentation of Work

The deadline for submission of your paper is Friday 14th December 2018 at 23:59. You should submit your paper (in Word or PDF format only) via the appropriate link on Moodle. The deadline is a hard deadline, and will only be extended if you have an exceptional factors application approved.

The deadline for submission of your presentation is Tuesday 11th December at 23:59. You should submit your slides (PowerPoint, PDF or similar) via the appropriate link on Moodle. Presentations will take place during scheduled classes on 12th December 2018. The exact schedule will be arranged at a later date.

Students who submit a **draft** of their paper using the *formative feedback submission* link on Moodle (deadline 23:59, Monday 19 November) will receive formative feedback during the class scheduled on Wednesday 28 November, 2018. Although this submission is optional, you are **strongly** encouraged to submit a draft, as you should find the feedback very useful in improving your final submission.

Please note that the teaching team will not be able to give feedback on your drafts other than the two opportunities you are given to get feedback on your survey, 24 October and 28 November. However, you are encouraged to ask specific questions related to your survey during the scheduled weekly lab sessions.

References

ACM (2017). ACM Master Article Template. [Online][Accessed 13 September 2017] http://www.acm.org/sigs/publications/proceedings-templates

Marking

Mark	Abstract (5%)	Introduction (10%)	Body (45%)	Conclusion (5%)	Macro-Structure(15%)	Presentation content (8%)	Presentation delivery (12%)
86 - 100	Concise, clearly outlines aim of study, methodology, findings and conclusions	Introduces topic Clear, logical progression from literature review to aims of study Choice of methodology introduced and supported Aims and hypotheses well formulated	All materials are relevant to the objectives of the study. Shows in-depth understanding of the techniques, methodology, and mechanisms described in the reading materials Provide synthesis and critical analysis of previous research and its relation to the current study Excellent coverage of the surveyed topic.	Clear presentation of fully justified findings. Logical conclusions based on research evidence. Critical competence. Recommendation for future work based on reviewed literature.	Clear and informative title Very effective organisation using the format specified. Divided into appropriate sections (Intro, Method, etc.) Headings and subheadings informative References complete and correctly cited in text and bibliography Very effective use of language with accuracy in syntax, grammar and mechanics, making explanation clear and coherent. Very wide variety of appropriate word choice.	Introduction is attention getting, lays out the problem well, and establishes a framework for the rest of the presentation. Technical terms are well defined in language appropriate for the target audience. Appropriate amount of material is prepared, and points made reflect well their relative importance. There is an obvious conclusion summarising the presentation.	Speaker maintains good eye contact with the audience and is appropriately animated (e.g., gestures, moving around, etc.). Delivery is poised, controlled, and smooth. Visual aids are well prepared, informative, effective, and not distracting. Length of presentation is within the assigned time limits. Information was well communicated. Q&A - Clear and concise response.
70 - 85	Strong writing in relation to motivations/ideas, approaches and results of the report	Clear presentation of topic. Methodology of survey discussed. Aims and hypotheses at least touched upon.	Materials are relevant to the objectives of the study. Shows sufficient understanding of the techniques/ methodology/ mechanisms described in the reading materials Provide sufficient synthesis and critical analysis of previous research and its relation to the current study Very good coverage of the surveyed topic	Logical conclusions Predominantly based on evidence. Evidence of ability to critically evaluate. Results linked consistently to objectives Good attempt to link between recommendations for future work and reviewed literature	Clear title Effective organisation using the format specified. Divided into appropriate sections and subsections Headings and subheadings appropriate References complete and correctly cited in text and bibliography with few omissions Effective use of language with mostly accurate syntax, grammar and mechanics, making explanation clear and coherent. Wide variety of appropriate word choice.	Clear structure. Good definition of terms. Points presented to support the analysis performed in the survey. Conclusions clearly presented.	Clear delivery. Good timing. Good use of visual aids. Clear, concise response to questions. Appropriate body language.

Mark	Abstract (5%)	Introduction (10%)	Body (45%)	Conclusion (5%)	Macro-Structure(15%)	Presentation content (8%)	Presentation delivery (12%)
60 - 69	Summary of the report in relation to motivations and ideas, approaches and results of the report in all aspects	Topic introduced but not fully explained. Methodology of survey discussed. Limited reference to aims, objectives or outcome of the survey.	Majority of materials are relevant to the objectives of the study. Shows some understanding of the techniques/ methodology/ mechanisms described in the reading materials Provide some synthesis and critical analysis of previous research and its relation to the current study Reasonable coverage of the surveyed topic	Clear presentation of conclusions related to evidence. Results linked to objectives of study. Some recommendations for future work, with links to reviewed literature	A clear title Well organised using the format specified. Good use of sections and subsections with appropriate naming. Good referencing. Good use of language with accuracy in syntax, grammar and mechanics, making explanation clear and coherent. Some variety of appropriate word choice.	Good structure Terms defined. Points support hypothesis of the survey paper. Obvious conclusion	Clear delivery. Good timing. Good use of visual aids. Clear, concise response to questions. Appropriate body language.
50 - 59	Summary of most aspects, such as motivations/ideas, approaches and the results of the report	Survey topic introduced but unclear to reader. Methodology presented with limited clarity. Very limited or no reference to aims, objectives or outcome of the survey.	Some materials are relevant to the objectives of the study. Shows some understanding of the techniques/ methodology/ mechanisms described in the reading materials An attempt at critical analysis and synthesis of the surveyed papers. Weak coverage of the survey topic.	Draws together some of the ideas from the survey. Results mostly linked to objectives of the study. Limited recommendations for future work, or weak links between recommendations and reviewed literature.	Acceptable title. Organisation approaches the expected format. Limited use of headings and subheadings, or sections and subsections poorly labelled. Good referencing, perhaps with minor errors. Acceptable use of language: writing is readable and coherent, with perhaps minor errors.	Basic structure is acceptable. Some terms used without definition or incorrectly. Some aspects of survey ignored. Conclusion presented.	Good delivery. Largely appropriate use of visual aids. Largely appropriate body language. Good response to questions. Presentation slightly (+/- 2 minutes) over- or under timed.

Mark	Abstract (5%)	Introduction (10%)	Body (45%)	Conclusion (5%)	Macro-Structure(15%)	Presentation content (8%)	Presentation delivery (12%)
40-49	Some attempt to capture the key motivations, approaches and results of the survey.	Some attempt to introduce the topic of the survey. Little or no description of the survey methodology.	Few materials are relevant to the objectives of the study. Shows limited understanding of the techniques/ methodology/ mechanisms described in the reading materials Provides limited synthesis and critical analysis of previous research and its relation to the current study	Weak conclusions. Recommendations for future work missing or not supported by surveyed papers.	Title does not capture the topic being surveyed. Poor organisation, ignoring expected format. Headings/subheadings poorly chosen or missing. References largely complete and correctly presented. Language use in general is good, but some areas are difficult to comprehend.	Poor structure. Inadequate description of the survey topic and results. Missing or inadequate conclusion.	Halting or sometimes inaudible delivery. Inappropriate use of visual aids. Poor body language such as lack of eye contact. Poor response to questions. Presentation over- or under-timed.
20-39	Incomplete description/summary regarding motivation/ideas, approach and results of the paper	Inadequate introduction of the survey topic. No presentation of the survey methodology.	Very few materials relevant to the survey topic. Poor understanding of the topics surveyed. No critical analysis of the papers.	Little or no conclusions drawn.	Title does not accurately reflect the content and objective of the paper Poor organisation, ignoring expected format. Missing sections. Missing references, deviations from the specified referencing style, errors in referencing. Poor use of language with limited accuracy in syntax, grammar and mechanics, making some parts of explanation incomprehensible and incoherent. Limited word choice.	Unstructured presentation. No clear definitions. Unclear link between survey paper and presentation. No conclusion	Inaudible delivery. Visual aids severely lacking. No interaction with audience. Unable to respond to questions. Presentation significantly over- or under-timed.

Mark	Abstract (5%)	Introduction (10%)	Body (45%)	Conclusion (5%)	Macro-Structure(15%)	Presentation content (8%)	Presentation delivery (12%)
1 - 19	Missing abstract.	Failure to adequately introduce the surveyed topic.	Very few materials are relevant to the objectives of the study. Shows very limited understanding of the techniques, methodology, and mechanisms described in the reading materials Provides very limited synthesis and critical analysis of previous research and its relation to the current study	Absent conclusions. No recommendations for future work	Title does not match the objective of the paper Very poorly organized with no reference to expected format. Missing main sections, incomplete, unstructured and poor use of headings, sections and citations Missing references, significant errors in existing references. Very poor use of language with poor accuracy in syntax, grammar and mechanics, making most parts of explanation incomprehensible and incoherent. Very limited word choice.	No match between presentation and survey. No structure. Incomprehensible to audience.	Audience unable to see or hear presentation. Cannot answer questions on survey topic.