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| **Senior Design: Adio** |
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| **Group Number** **19**  **Team Members:**  Sneha Advani, Bharath Jaladi, Arjun Lal, Romit Nagda, Sneha Rampalli  **Advisors**: Sangeeta Vohra |
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Abstract

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This document serves to describe the work done by Group 19 on Adio, which is an application for Uber and Lyft drivers to play their music during their shifts interspersed with location-based advertisements at a frequency they set.

Motivation & Goal

Advertisers, especially small businesses, want and need cost-effective ways to reach high-potential consumers. Additionally, there are currently cost-barriers for entry into advertising mediums such as radio for smaller businesses. Moreover, consumers want and need more relevant and effective methods to discover and connect with businesses that are easily accessible to them.

Most Uber and Lyft drivers play music on the radio, through which ads, earning revenue for radio stations, play every few minutes. Thus, our team wanted to take this advertising opportunity and improve upon it while also providing another source of income for these drivers.

No formal survey was conducted, but each team member spoke to Uber/Lyft drivers to gauge interest from their end. Specifically, we gave a one-minute pitch of our idea and asked for their feedback on the following points: (1) if they play any music while they’re driving their riders to see if most drivers would play ads during each trip, (2) if they would use the product, given the existence of products with similar goals, (3) if drivers would be interested in beta-testing our service. We received positive feedback from the drivers, as the use of this service requires little effort on their end, besides downloading the application. The only concern on their end was that the user experience could be reduced because of ads. However, drivers can set the frequency of the ads, and given the existence of Uber/Lyft ratings, the driver will be incentivized to balance the number of ads playing during each ride with the user experience.

We also spoke to our networks of family and friends to both hear their thoughts on our idea and explore any possible concerns they would have. The feedback we received was generally positive, especially amongst college students. Given that students on campus call rides to Center City Philadelphia for downtown events, it gives them an idea of activities in the area. Adults also expressed interest in this idea, for example, when they are traveling on business trips and want to explore the area around them during their free time.

Related Work

To determine how to best differentiate ourselves, we did a great deal of market research to identify several competitors, listed below. We categorized competitors as follows.

Table-based Rideshare Advertising:

1. Octopus (<https://www.playoctopus.com/)>: provides free tablets to drivers that play trivia games and location-based video advertisements.
2. Vugo (<https://govugo.com)>: provides in-car entertainment in the form of video games, apps, film shorts, sports, and news.
3. Surf (<https://ridewithsurf.com/)>: provides interactive tablets for rideshare entertainment, such as videos, music, podcasts, live radio.

Rideshare Billboard Advertising:

1. Firefly (<https://fireflyon.com/)>: provides lighted billboards for the top of cars that cycle through different targeted advertisements in the area.
2. Halo Cars (<https://www.halocars.co/)>: provides LED billboards for the top of rideshare vehicles.

Music Advertising Phone Application:

1. Steereo (<https://steero.com/)>: creates playlists for drivers with sponsored music from independent artists paying to promote their songs.

Given the current competition in our target market, we decided to differentiate our product in several ways that we feel are most beneficial to businesses, drivers, and riders. Firstly, our product is purely a software-based and thus eliminates any hassle that may come with hardware solutions (such as billboards). Secondly, we integrated with the Spotify API to deliver ads that are interspersed with predetermined playlists set by drivers, which makes the experience more personalized. Secondly,

General Instructions

Manuscripts must be in two-column format. Exceptions to the two-column format include the title, authors’ names and complete addresses, which must be centered at the top of the first page, and any full-width figures or tables (see the guidelines in Subsection 3.6). Lines should be justified, with even spacing between margins (Ctrl+J). Single-spaced lines are permitted, but authors are encouraged to use Paragraph spacing at Multiple, 1.05pt, with Font character spacing condensed with kerning of 0.1pt, and Margins at 0.98in, for consistency with A4 paper and documents formatted with LaTeX. Go to Format, Document, Page Setup, and make sure A4 is selected. The manuscript should be printed single-sided and its length should not exceed the maximum page limit described in Section 5.

Pages have a ruler, header and footer for initial submission, with header at 0.3 in from top and footer at 0.4 in from bottom. When you first create your submission on softconf, please fill in your submitted paper ID where \*\*\* appears in the \*\*\* at the header at the top. If the paper is accepted, remove the header, footer (page numbers), and the ruler for the final version (camera-ready). Do not number the pages in the camera-ready version.

The review process is double-blind, so do not include any author information (names, addresses) when submitting a paper for review. However, you should maintain space for names and addresses so that they will fit in the final (accepted) version. The ACL 2019 MS Word style contains a 2.5 in table beneath the title for this purpose.

* 1. The Ruler

The ACL 2019 style defines a printed ruler that should be present in the version submitted for review. The ruler is provided in order that reviewers may comment on particular lines in the paper without circumlocution. If you are preparing a document without the provided style files, please arrange for an equivalent ruler to appear on the final output pages. The presence or absence of the ruler should not change the appearance of any other content on the page. The camera-ready copy should not contain a ruler.

In this Word template, you can add the ruler to each individual page by copying it from another page. The Ruler consists of separate left-hand rulers and right-hand rulers. Each ruler is a text box, sized 10 in x 0.45 in, flushed with the sides of the page, with a table containing numbers. The table has no borders, and the edges are pushed to the edges of the textbox. The left part of the ruler is justified left, left indent 0.1 in/right indent 0 in, and saved in the “ACL Ruler Left” style; and the right-hand ruler, justified right had left indent 0 in/right indent 0.1 in, saved in the “ACL Ruler Right” style. Number text is in Arial, and spacing between each line is Multiple, 1.05 in, with 4.5 pt below each line. After pasting a new ruler onto a page, highlight the ruler text and press F9 to update the numbers. Align the text box Middle, and Center, and then Arrange Behind Text.

Reviewers: Note that the ruler measurements do not align well with lines in the paper — this turns out to be very difficult to do well when the paper contains many figures and equations, and, when done, looks ugly. Just use fractional references (*e.g.*, this paragraph ends at mark 141.5).

* 1. Electronically-available Resources

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ACL provides this description in LATEX2e (acl2019.tex) and PDF format (acl2019.pdf), along with the LATEX2e style file used to format it (acl2019.sty) and an ACL bibliography style (acl2019.bst) and example bibliography (acl2019.bib). These files are all available at [http://naacl2019.org/downloads/ acl2019-latex.zip](http://naacl2019.org/downloads/%20naaclhlt2019-latex.zip). A Microsoft Word template file (acl2019-word.docx) and example submission pdf (acl2019-word.pdf) is available online. We strongly recommend the use of these style files, which have been appropriately tailored for the ACL 2019 proceedings.

* 1. Format of Electronic Manuscript

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For the production of the electronic manuscript, you must use Adobe's Portable Document Format (PDF). This format can be generated from postscript files: on Unix systems, you can use ps2pdf for this purpose; on Windows, you can use Adobe's Distiller, an online service such as <http://go4convert.com/>, or if you have cygwin installed, you can use dvipdf or ps2pdf.

Please make sure that your PDF file includes all the necessary formatting, hyperlinks, and fonts (especially tree diagrams, symbols, and fonts with Asian characters). When you print or create the PDF file, there is usually an option in your printer setup to include none, all, or just non-standard fonts. Please make sure that you select the option of including ALL the fonts. Before sending it, test your PDF by printing it from a computer different from the one where it was created. Moreover, some word processors may generate very large PDF files, where each page is rendered as an image. Such images may reproduce poorly. In this case, try alternative ways to obtain the PDF. One way on some systems is to install a driver for a postscript printer, send your document to the printer specifying “Output to a file”, then convert the file to PDF.

It is of utmost importance to specify the A4 format (21 cm x 29.7 cm) when formatting the paper. Print-outs of the PDF file on A4 paper should be identical to the hardcopy version. If you cannot meet the above requirements about the production of your electronic submission, please contact the publication chairs above as soon as possible.

* 1. Layout

Format manuscripts two columns to a page, in the manner these instructions are formatted. The exact dimensions for a page on A4 paper are:

* Left and right margins: 2.5 cm

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Table : Font guide.

* Top margin: 2.5 cm
* Bottom margin: 2.5 cm
* Column width: 7.7 cm
* Column height: 24.7 cm
* Gap between columns: 0.6 cm

Papers should not be submitted on any other paper size. If you cannot meet the above requirements about the production of your electronic submission, please contact the publication chairs above as soon as possible.

* 1. Fonts

For reasons of uniformity, Adobe's Times Roman font should be used. If Times Roman is not available, you may use the Times New Roman font, which is often provided by default and only slightly different.

* 1. The First Page

Center the title, author name(s) and affiliation(s) across both columns (or, in the case of initial sub- mission, space for the names). Do not use footnotes for affiliations. Use the two-column format only when you begin the abstract.

Title: Place the title centered at the top of the first page, in a 15-point bold font. (For a complete guide to font sizes and styles, see Table 1.) Long titles should be typed on two lines without a blank line intervening. Approximately, put the title at 2.5 cm from the top of the page, followed by a blank line, then the author name(s), and the affiliation(s) on the following line. Do not use only initials for given names (middle initials are allowed). Do not format surnames in all capitals (*e.g.*, use “Mitchell,” not “MITCHELL”). Do not use format title and section headings in all capitals as well, except for proper names (such as “BLEU”) that are conventionally in all capitals. The affiliation should contain the author's complete address, and if possible, an electronic mail address. Start the body of the first page 7.5 cm from the top of the page.

The title, author names and addresses should be completely identical to those entered to the electronic paper submission website in order to maintain the consistency of author information among all publications of the conference. If they are different, the publication chairs may resolve the difference without consulting with you; so it is in your own interest to double-check that the information is consistent.

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Abstract: Type the abstract at the beginning of the first column. The width of the abstract text should be smaller than the width of the columns for the text in the body of the paper by about 0.6cm on each side. Center the word Abstract in a 12 point bold font above the body of the abstract. The abstract should be a concise summary of the general thesis and conclusions of the paper. It should be no longer than 200 words. The abstract text should be in 10 point font.

Text: Begin typing the main body of the text immediately after the abstract, observing the two-column format as shown in the present document. Use 11 points for text. Indent when starting a new paragraph, about 0.16 in. This is accomplished with Right click, Styles, “ACL First Line”.

* 1. Sections

Headings: Type and label section and subsection headings in the style shown on the present document. Use numbered sections (Arabic numerals) in order to facilitate cross references. Number subsections with the section number and the subsection number separated by a dot, in Arabic numerals. In bold, use 11 points for subsection headings, 12 points for section headings. Do not number subsubsections.

Citations: Citations within the text appear in parentheses as ([Gusfield, 1997](#Gusfield1997)) or, if the author's name appears in the text itself, as Gusfield ([1997](#Gusfield1997)). Collapse multiple citations as in ([Gusfield, 1997](#Gusfield1997); [Aho and Ullman, 1972](#AhoUllman72)). Append lowercase letters to the year in cases of ambiguities. Treat double authors as in ([Aho and Ullman, 1972](#AhoUllman72)), but write as in ([Chandra et al., 1981](#ChandraEtAl1981)) when more than two authors are involved. Also refrain from using full citations as sentence constituents.

We suggest that instead of

“([Gusfield, 1997](#Gusfield1997)) showed that ...”

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“Gusfield ([1997](#Gusfield1997)) showed that ...”

Hyperlinks: Within-document and external hyperlinks are indicated with Dark Blue text, Color Hex #000099. In order to create hyperlinks between citations and references, as you insert each full reference in the References section, highlight it and then select Insert, Bookmark. Link back to the reference from its citations in the text by highlight the citation, right clicking, and selecting Insert, Cross-Reference, then selecting the Bookmark you’ve saved. Highlight the citation again to give make it dark blue (included in this theme), if it is not automatically applied. If there are problems saving the hyperlinks when you convert the document to PDF, use an online converter such as <http://go4convert.com>.

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Digital Object Identifiers: As part of our work to make ACL materials more widely used and cited outside of our discipline, ACL has registered as a CrossRef member, as a registrant of Digital Object Identifiers (DOIs), the standard for registering permanent URNs for referencing scholarly materials. As of 2017, we are requiring all camera-ready references to contain the appropriate DOIs (or as a second resort, the hyperlinked ACL Anthology Identifier) to all cited works. Thus, please ensure that you use References that contain DOI or URLs for any of the ACL materials that you reference. Appropriate records should be found for most materials in the current ACL Anthology at <http://aclanthology.info/>.

As examples, we cite ([Goodman et al., 2016](#GoodmanEtAl2016)) to show you how papers with a DOI will appear in the bibliography. We cite ([Harper, 2014](#Harper2014)) to show how papers without a DOI but with an ACL Anthology Identifier will appear in the references.

As reviewing will be double-blind, the submit- ted version of the papers should not include the authors’ names and affiliations. Furthermore, self-references that reveal the author’s identity, *e.g.*,

“We previously showed ([Gusfield, 1997](#Gusfield1997)) ...”

should be avoided. Instead, use citations such as

“Gusfield ([1997](#Gusfield1997)) previously showed ... ”

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Please do not use anonymous citations and do not include acknowledgements when submitting your papers. Papers that do not conform to these requirements may be rejected without review.

References: Gather the full set of references together under the heading References; place the section before any Appendices. Arrange the references alphabetically by first author, rather than by order of occurrence in the text. Provide as complete a reference as possible, using a consistent format, such as the one for *Computational Linguistics* or the one in the *Publication Manual of the American Psychological Association* ([American Psychological Association, 1983](#APA83)). Use of full names for authors rather than initials is preferred. A list of abbreviations for common computer science journals can be found in the Association for Computing Machinery ([1983](#ACM83)) *Computing Reviews*.

The bibliography style described here roughly fits the American Psychological Association format, allowing regular citations, short citations and multiple citations as described above.

Submissions should accurately reference prior and related work, including code and data. If a piece of prior work appeared in multiple venues, the version that appeared in a refereed, archival venue should be referenced. If multiple versions of a piece of prior work exist, the one used by the authors should be referenced.

Appendices: Appendices, if any, directly follow the text and the references. Letter them in sequence and provide an informative title: Appendix A. Title of Appendix.

* 1. Footnotes

Footnotes: Put footnotes at the bottom of the page and use 9 point font. They may be numbered or referred to by asterisks or other symbols.[[1]](#footnote-1) Footnotes should be separated from the text by a line.[[2]](#footnote-2)

* 1. Figures and Tables

Creating: To create a new Figure or Table, insert a Text Box where you want it to appear (generally, centered at the top of a column close to where it is referred to) and then fill it in with the Figure (or Table). Highlight and right click to add Caption, with the ACL Caption style, which places 10 pt below and above the caption.

Placement: Place figures and tables in the paper near where they are first discussed, as close as possible to the top of their respective column. Wide figures and tables may run across both columns and should be placed at the top of a page.

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| Figure 1: Figure caption. |

In MSWord, authors can place a Figure (*e.g.*, a graphic and its caption) inside the rows of a 2 x 1 table (2 rows and 1 column) with invisible borders. Specify table positioning by right-clicking its handle in the upper left corner. Place the image in the center of the first row, and the caption in the center of the second row.

Captions: Provide a caption for every table and figure; number each one sequentially in the form: “Figure 1: Figure caption.”, “Table 1: Table caption.” Type the captions of the figures and tables below the body, using 10 point text. Captions should be placed below illustrations. Captions that are one line are centered. Captions longer than one line are left-aligned.

Numbering: To update numbering, highlight all the relevant text (*e.g.*, Ctrl-A + F9). This will update all the numbering applicable to tables, figures, equations, and headings.

Cross-referencing: To add a cross reference to a figure or table:

* Place the mouse pointer at the location where you wish to add the cross-reference.
* Click on the Insert menu, (then click Reference), and then Cross-reference in the Links panel.
* In the Cross-reference dialog box, click the caption to which you are building the text reference.
* For a figure, under Reference Type, click Figure.
* Under Insert Reference To, click Only Label and Number, then click OK.
* Once the reference is in place, apply the ‘Normal’ font style (size 11, no bold face).

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* This is an example reference to Figure 1.

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* 1. Equations

An example equation is shown below:

(1)

To add new equations, authors are encouraged to copy this existing equation line, and then replace with the new equation. The numbering and alignment of equation line elements is automatic. To update equation numbering, press Ctrl-A + F9. Note: this will only update the number to the right of the equation; to update numbering within the text you must create a cross-reference.

Cross-referencing: To create a cross-reference for an equation:

* Create a bookmark for it.
* Select the number to the right of the equation. Go to Insert, Bookmark (in the Links panel), and then create a name for your equation. Press Add to create the bookmark.
* To refer back, place the mouse pointer at the location where you wish to add the cross reference.
* Go to Insert, Cross-reference (in the Links panel). In the dialogue box, select Bookmark and Bookmark Text from each dropdown list. Uncheck Insert as Hyperlink, then click OK.
* This will make it such that whenever a new equation is added, the references to the equation will be updated when Ctrl-A + F9 is pressed.
* This an example cross-reference to Equation (1).
  1. Accessibility

In an effort to accommodate people who are color-blind (as well as those printing to paper), grayscale readability for all accepted papers is encouraged. Color is not forbidden, but authors should ensure that tables and figures do not rely solely on color to convey critical distinctions. A simple criterion: All curves and points in your figures should be clearly distinguishable without color.

* 1. From Submitted to Camera-Ready

To remove submission formatting for the camera-ready document, delete the header and footer on the first page (double clicking in the area, then delete the text). This will remove them from the rest of the document. To remove the ruler, highlight the lists of numbers and delete.

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1. Translation of non-English Terms

It is also advised to supplement non-English characters and terms with appropriate transliterations and/or translations since not all readers understand all such characters and terms. Inline transliteration or translation can be represented in the order of:

original-form

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1. Length of Submission

The ACL 2019 main conference accepts submissions of long papers and short papers. Long papers may consist of up to eight (8) pages of content, plus unlimited pages for references. Upon acceptance, final versions of long papers will be given one additional page – up to nine (9) pages with unlimited pages for references – so that reviewers’ comments can be taken into account. Short papers may consist of up to four (4) pages of content, plus unlimited pages for references. Upon acceptance, short papers will be given five (5) pages in the proceedings and unlimited pages for references. For both long and short papers, all figures and tables that are part of the main text must be accommodated within these page limits, observing the formatting instructions given in the present document. Papers that do not conform to the specified length and formatting requirements are subject to be rejected without review.

ACL 2019 does encourage the submission of additional material that is relevant to the reviewers but not an integral part of the paper. There are two such types of material: appendices, which can be read, and non-readable supplementary materials, often data or code. Do not include this additional material in the same document as your main paper. Additional material must be submitted as one or more separate files, and must adhere to the same anonymity guidelines as the main paper. The paper must be self-contained: it is optional for reviewers to look at the supplementary material. Papers should not refer, for further detail, to documents, code or data resources that are not available to the reviewers. Refer to Appendix A and Appendix B and for further information.

Workshop chairs may have different rules for allowed length and whether supplemental material is welcome. As always, the corresponding call for papers is the authoritative source.

1. Multiple Submission Policy

Papers that have been or will be submitted to other meetings or publications must indicate this at submission time. Authors of papers accepted for presentation at ACL 2019 must notify the program chairs by the camera-ready deadline as to whether the paper will be presented. All accepted papers must be presented at the conference to appear in the proceedings. We will not accept for publication or presentation papers that overlap significantly in content or results with papers that will be (or have been) published elsewhere.

Preprint servers such as arXiv.org and ACL-related workshops that do not have published proceedings in the ACL Anthology are not considered archival for purposes of submission. Authors must state in the online submission form the name of the workshop or preprint server and title of the non-archival version. The submitted version should be suitably anonymized and not contain references to the prior non-archival version. Reviewers will be told: “The author(s) have notified us that there exists a non-archival previous version of this paper with significantly overlapping text. We have approved submission under these circumstances, but to preserve the spirit of blind review, the current submission does not reference the non-archival version.” Reviewers are free to do what they like with this information.

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Authors submitting more than one paper to NAACL must ensure that submissions do not overlap significantly (> 25%) with each other in content or results. Authors should not submit short and long versions of papers with substantial overlap in their original contributions.

1. STREAM Tools

This Microsoft Word file was updated in 2016 with STREAM Tools, designed for creating well-formatted reports and papers with Microsoft Word (Mamishev, 2010; Mamishev, 2013).

Acknowledgments

The acknowledgements should go immediately before the references. Do not number the acknowledgments section. Do not include this section when submitting your paper for review.

References

Alfred. V. Aho and Jeffrey D. Ullman. 1972. *The Theory of Parsing, Translation and Compiling, volume 1*. Prentice-Hall, Englewood Cliffs, NJ.

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Association for Computing Machinery. 1983. *Computing Reviews*, 24(11):503-512.

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Dan Gusfield. 1997. *Algorithms on Strings, Trees and Sequences*. Cambridge University Press, Cambridge, UK.

Mary Harper. 2014. [Learning from 26 languages: Pro- gram management and science in the babel program](http://aclweb.org/anthology/C14-1001). In *Proceedings of COLING 2014, the 25th International Conference on Computational Linguistics: Technical Papers*. Dublin City University and Association for Computational Linguistics, page 1. <http://aclweb.org/anthology/C14-1001>.

Alexander V. Mamishev and Murray Sargent. 2013. *Creating Research and Scientific Documents Using Microsoft Word*. Microsoft Press, Redmond, WA.

Alexander V. Mamishev and Sean D. Williams. 2010. *Technical Writing for Teams: The STREAM Tools Handbook*. Wiley-IEEE Press, Hoboken, NJ.

1. Appendices

Appendices are material that can be read, and include lemmas, formulas, proofs and tables that are not critical to the reading and understanding of the paper. Appendices should be uploaded as supplementary material when submitting the paper for review. Upon acceptance, the appendices come after the references, as shown here.

1. Supplementary Material

Submissions may include non-readable supplementary material used in the work and described in the paper. Any accompanying software and/or data should include licenses and documentation of research review as appropriate. Supplementary material may report preprocessing decisions, model parameters, and other details necessary for the replication of the experiments reported in the paper. Seemingly small preprocessing decisions can sometimes make a large difference in performance, so it is crucial to record such decisions to precisely characterize state-of-the-art methods.

Nonetheless, supplementary material should be supplementary (rather than central) to the paper. Submissions that misuse the supplementary material may be rejected without review. Supplementary material may include explanations or details of proofs or derivations that do not fit into the paper, lists of features or feature templates, sample inputs and outputs for a system, pseudo-code or source code, and data. (Source code and data should be separate uploads, rather than part of the paper).

The paper should not rely on the supplementary material: while the paper may refer to and cite the supplementary material and the supplementary material will be available to the reviewers, they will not be asked to review the supplementary material.

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1. This is how a footnote should appear.

   Note the line separating the footnotes from the text. [↑](#footnote-ref-1)
2. [↑](#footnote-ref-2)