

A Comparative Study of FL Studio, Logic Pro, and Ableton: Features, Limitations and Future Prospects

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Abstract. This article provides a comparative overview of three widely useful digital audio workstations (DAWs): FL Studio, Logic Pro, and Ableton. Whenever it is, music innovation is a both technical and creative process, and DAWs play an essential tool as role that turn abstract ideas into real compositions. The objective of this study is to introduce and analyze the features, interfaces, and workflows of the three famous DAWs, while also identify their problems, which use a comparative approach that adopt user experiences and community sharing feedback, and possible future prospects. In details, the findings indicate that each DAW has its own particular strengths: FL Studio excels in its ease of creation process and its outstanding MIDI; Logic Pro provides an extensive sound libraries, and a special project --- GarageBand; and Ableton stands out for its non-linear and clear workflow that optimized for live performance. However, each issues remain, such as hardware requirements, and saving problem. Interestingly, this article also highlights the future prospects of DAW development, that provide a comprehensive review, which may help readers and composer in this field have a better understanding of the current developments and the potential future directions. In addition, the combination of artificial intelligence (AI) as an assistant to automate finish tasks and suggest musical ideas. Overall, this paper contributes to understanding the evolution of DAWs and their role in creating contemporary innovation.

Keywords: Digital audio workstations, piano roll, plug-ins area, MIDI keyboard

1. Introduction

Nowadays, music has been one of the most powerful and famous forms for human expression, not only because the method can cause emotional resonance but also because it will promote an improvement of innovation and creativity. In the digital era, creation in music is significantly increased through technology, which software plays a very important role in helping musicians to compose, perform, and share their work with others. Among these software, Digital Audio Workstations (DAW) have become the base of music production, which allows music-makers across the world use to turn ideas into reality [1]. Some of the most well-known software are FL Studio, Logic Pro, and Ableton. They all have over hundreds of instruments for professional songwriting, beat-making, editing, and mixing [2].

However, many reviews and studies focus and highlight technical features or user's preferences about DAW, fewer works provide and research on a comparison of differences between software and

software applications, shared limitations of DAW, list precise data and whole contribution on the development of music composition. For instance, as the Reddit mentioned that there are mainly six reasons why Ableton is the one that everyone uses, such as flexible routing, easy modulation, and live performance focus [3, 4].

This research aims to provide a comparative overview of three of the most widely used DAWs, which choose FL Studio, Logic Pro, and Ableton as the object for the analysis. Each of these tools reflects a distinct characteristic of music-making. While every coin has two sides, their limitations and differences also be showed in this paper, and list some data for supporting the idea. Finally, the future development is also one of the most important sections in this research, which will be provided finally.

2. Digital audio workstations

2.1. FL Studio

FL Studio shown in Figure 1, one of the most popular applications for music production, which is made by Image-Line. Its earlier version was called Fruity Loops [5]. It is a DAW, and includes tools, synthesizers, effects. It is very successful is because its earlier version was very simple and attractive, that whether people are the professionals or the beginners, the users only had to perform just a few operations, such as choose a synthesizers, record a fragment, create some patterns, then fill a playlist of the patterns [5], which enhancing its flexibility and creative potential, and has been built to be quick to provides enough functions to satisfy musicians. So, it is clear that FL Studio is suitable for people without understanding or learning music theory. One of its main features is its powerful mixer. Such as FM synthesis, RM synthesis, and grain synthesis, which they are based on frequency modulation, ring-balance modulation, and combination of short fragments. This allows people to easily create a professional-sounding mix [5]. Another one is its famous piano roll editor, this allows users to build and edit MIDI patterns and automation curves, which can be used to control various parameters. So that making it easy to create interesting songs [6]. Furthermore, FL Studio has a clear and straightforward interface for users.

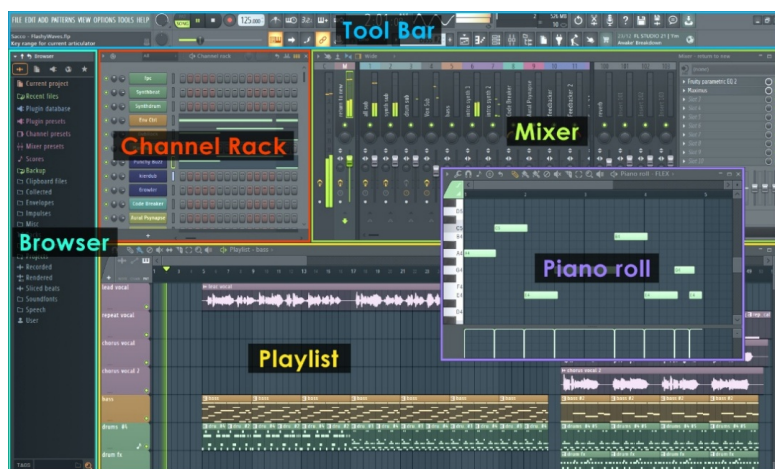


Figure 1. Snap shot of FL Studio [7]

It comes up with where people can find the tools, playlist, control bar, and where people can edit the notes and patterns [6]. It is possible that people may see a little different screen depending on the different version of FL Studio. Also, there are a lot of templates that people can try quickly, each

templates contain an initial starting setup and preloaded plugins. However, people still can add more different but interesting plugins based on themselves. Next, in the tool bar, there five main buttons which will help people to be able to create, organize, and apply effects to music --- Playlist, piano roll, channel rack, mixer, and browser [8].

2.2. Logic Pro

Logic Pro shown in Figure 2, a first choice for musician and composer who pursuit precision and creative freedom, which belongs to famous company --- Apple. At the beginning, the Logic Pro is created by E-Magic. However, in 2002, Apple acquired E-Magic and cancel Window supports. In March 2004, the Apple introduced Logic Pro 6, and a slightly scaled-down version, Logic Express. Later on, Apple also released more and more updated versions, such as adding Flex time and Drum replacer, and importing GarageBand project directly into Logic Pro [9]. Although it is a derivative version of GarageBand, its unique library of virtual instruments and effect plug-ins, with built-in powerful tools is still very impressed, which provides a platform for all users to create music from electronic to classical [2, 10]. These special virtual instruments and effect plug-ins are not only numerous in quantity, but also particularly comprehensive in functions, such as sound design and sound mix. That can reduce the dependence on third-party plug-ins. Moreover, Logic Pro has powerful MIDI, that can work with USB and MIDI keyboard controllers and other MIDI devices, such as sound modules, control surfaces, effects processors, mixers [10].

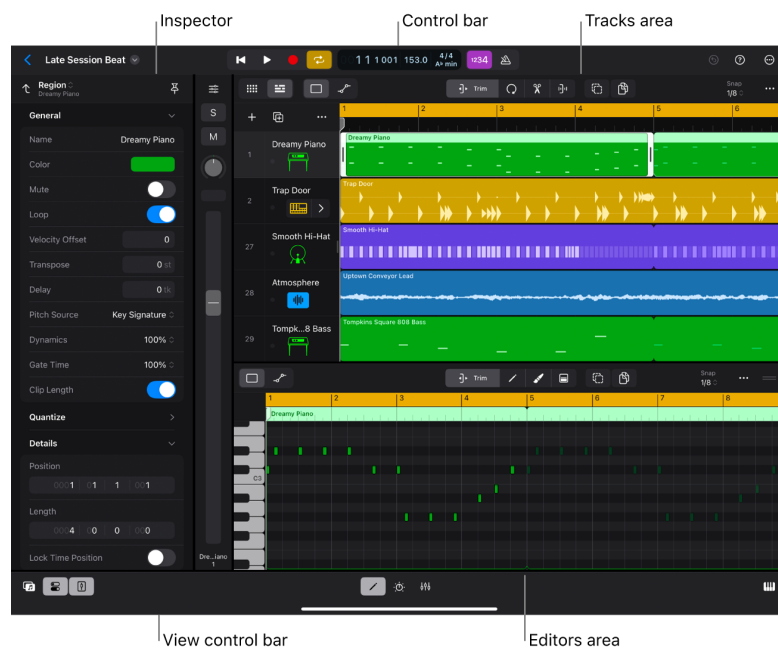


Figure 2. Snap shot of Logic Pro[11]

The working areas of Logic Pro include Control bar, view control bar, tracks area, live Loops grid, browser, editors, inspector, fader, plug-ins area, mixer, and play Surfaces. The control bar provides the transport buttons people use to control playback of their project and frequently used commands. The view control bar contains buttons to show and hide the different working areas of Logic Pro, such as browser and fader. The inspector can edit and show parameters for selected regions, tracks, and other items. The track area is where people record audio and MIDI regions, add media files, and arrange the timeline regions. The last is editor area, which have a set of editors,

including the Audio Editor, Piano Roll Editor, Session Player Editor, and Step Sequencer, that can help to make precise changes to particular regions and correspond contents [11].

2.3. Ableton

Ableton shown in Figure 3, is a music software that is particularly popular among electronic music producers, and is created by Ableton AG, which is a German music software company. It was developed as one of the first DAWs with a non-linear sequencing environment, that is much earlier than others, such as Logic Pro or GarageBand. However, nowadays' music producers instead of thinking of a computer as simply a digital tape recorder, they show their works use technology as a real-time performance platform [12]. So, this bring some creative idea to the software developer, the modular workflow of Ableton can be more welcoming and convenient than other DAWs. Also, this makes it easy to improvise and create music on the fly, which also is why Ableton Live is often used in live performances [4, 6]. Being inherently designed for live performance, Ableton spinning beat is famous and well-loved by musicians around the world.



Figure 3. Snap shot of Ableton [13]

Ableton's user interface is designed to be modular, its different sections can be hidden and shown as needed using several toggles around its interface. One notable feature of Ableton's interface when getting started with is called the Info View, which is in the bottom left. The Info View provides information about any section of Ableton's interface. At the top of the Ableton's interface is the control bar, which always are visible. It has things such as metronome, arrangement position, indicator, play and stop, record buttons, MIDI keyboard, loop control, and scale of currently selected clips. On the left hand side is the browser, where people find and load all instruments and sounds. The main section of the interface is the middle and right part, where people making music. The arrangement views where people arrange the parts of song on a timeline, contains beat and time ruler. In addition, at the top of it is an overview of all the clips. The tracks contain the instruments and sounds, and the mixer can be toggled at the bottom right. The last section, which is at the bottom of the interface is the detail view. It is divided by the device view and the clip view, that people can toggled by two tabs in the bottom right [14].

3. Discussion

3.1. Limitations of mentioned software

Although FL Studio, Logic Pro, and Ableton are widely used as leading DAWs, they are not without limitations. Take FL Studio as an example, its biggest problem in general is saving project. People can export the songs and works that they create in MP3 or WAV form, however, people cannot save their project, which means whatever people created will only last until FL Studio is open, once people close FL Studio, they cannot open the exactly same project which they made their song again [15]. Therefore, users are restricted from editing it repeatedly. This will cause some inconvenience for many users, especially musicians who like to repeatedly refine their works.

The most significant and apparent problem is Apple-only and expensive to use, which compared with other DAWs. In Addition, other people mention that the audio mixer is complex and hard to use. Since it takes more time than in Pro Tools, such as its reverb plugins are not necessarily the best. Although those people still choose Logic Pro, actually it needs to get plugins to mix my vocals in it better [16].

The significant disadvantage is the absence of per-plugin delay compensation. Although Ableton has implemented per-chain compensation for live environments to conserve resources, many users argue that as Live has evolved beyond just live performance software, per-plugin delay compensation has become a must-have feature [17]. The lack of this functionality has led some users to consider switching to other DAWs.

3.2. Future prospects

The future development of DAWs, such as FL Studio, Logic Pro, and Ableton is promising, especially in music technology which combine with artificial intelligence (AI). If people open a DAW from the year 2000, and the vast majority of the features — both functionally and visually are easily recognized as any DAW people might use today. Such as control bar, MIDI note editors, plugins area, mixer, and play surfaces. DAWs are built on legacy code which cannot easily be adjusted as user expectation, or new technology arrives. Where DAWs stalled, the plugins filled the gap. It allows developers to create new ideas to fix those problems. However, although there are thousands of plugins are available on the market, also, with more and more plugins arriving every month, very few truly innovations are pushed out each time. The covid-19 make billions of people restricted at their homes and, which causes an explosion of interest in music-making [18].

What's both interesting and shocking is that there is a website called WavTool has built a very basic music-making software, including a chatbot as a feature that can complete tasks like adding MIDI notes and sidechain compression, adjusting signal paths, and coming up with drum patterns, all through text prompts alone. Although it is basic and have some problems sometimes, the proof of concept is very impressive to people [18]. This is because a chatbot inside a DAW, is similar as people's own personal studio assistant who is learned everything about the way people work, and help people to make better songs.

4. Conclusion

In this work, this paper proposed the features and advantages of three famous DAWs --- FL Studio, Logic Pro and Ableton. For instance, the FL Studio is good at flexibility and creative potential for all level of users, the Logic Pro feature has powerful tools and instruments, and the last Ableton is very

beneficial to people who need to play in live performance. Also, this article mentions its limitations and problems, such as, platform restriction or function problems, and DAWs' future prospects that the AI can be a music assistant to assist the musicians, and effectively help them to do some basic steps.

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