Is 40 the new 60? How popular media portrays the employability of older software developers

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Alerted by our previous research as well as media reports and discussions in online forums about ageism in the software industry, we set out to study the public discourse around age and software development. We analyzed popular online articles and related discussions on Hacker News through the lens of (perceived) employability issues and potential mitigation strategies. Besides rather controversial strategies such as disguising age-related aspects in résumés or undergoing plastic surgeries to appear young, we highlight the importance of keeping up-to-date, specializing in certain tasks or technologies, and present role transitions as a way forward for veteran developers. With our results, we target decision makers in software projects to help them anticipate and mitigate challenges that their older employees may face.

Introduction

Employability is a common concern among software developers in all career stages. While recent graduates and career jumpers want to land their first job, more senior developers move between roles, teams, or companies. Recent media reports identified ageism as a major barrier in the hiring process of large software companies. This media coverage, statements such as Mark Zuckerberg’s infamous opinion that “young people are just smarter” and discussions in popular online forums contribute to the notion that it is hard to be “old” (whatever that means) and a successful software developer at the same time. This stereotype influences current and prospective software developers alike, because the power of language and its influence on individuals cannot be underestimated.

While the perception that older people are worse at learning new things is stable across cultures, age is usually also associated with wisdom and knowledge. In our previous research, however, we learned that in software development, experience does not seem to be valued to the same degree as being fast and keeping up with the latest trends. In this article we followed up on that observation by studying which employability strategies popular online articles and related online discussions suggest for older software developers.

To this end, we analyzed online media reports on age and software development. Using their search result ranking as a proxy for popularity, we qualitatively analyzed 20 popular online

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1. [https://www.theguardian.com/technology/2019/jul/22/google-pays-11m-to-jobseekers-who-alleged-age-discrimination](https://www.theguardian.com/technology/2019/jul/22/google-pays-11m-to-jobseekers-who-alleged-age-discrimination)
2. [http://www.psychologytoday.com/us/blog/boomers-30/201710/young-people-are-just-smarter](http://www.psychologytoday.com/us/blog/boomers-30/201710/young-people-are-just-smarter)
3. [https://www.quora.com/Is-30-years-old-too-old-to-learn-computer-programming](https://www.quora.com/Is-30-years-old-too-old-to-learn-computer-programming)
articles retrieved using the search query “age software developer” on Google. We contextualize our findings using scientific literature on ageing and software development, and using a follow-up study investigating discussions on Hacker News around the above-mentioned articles.

We present and discuss our findings through the lens of (perceived) employability issues mentioned in the articles and forum discussions. We target decision makers in software projects such as managers and team leaders to alert them about potential issues their “veteran” employees may face, helping them to anticipate and potentially mitigate those issues. Besides implications for practitioners, we hope that this article triggers further research on the specific challenges of older software developers. Especially in industrialized countries, the demographic change leads to an older workforce, since people are expected to retire later. Still, the challenges that older developers face in a competitive field like software development are yet to be explored.

**Background**

Societies across the world are ageing, a phenomenon that the United Nations consider “one of the most significant social transformations of the twenty-first century”. Consequently, the number of older software developers is increasing. In the USA, for example, the number of software developers aged 55 to 64 years increased from 87,000 (8.3%) in 2011 to 195,000 (10.7%) in 2019 [4]. Nevertheless, little is known about the specific challenges that older developers face in their professional life.

Regarding older workers in general, Krampe and Charness found that they can maintain high skill levels throughout their career, not only for knowledge-based work but also for work involving speed and accuracy [5]. In the context of free and open source software, Davidson et al. found that the top motivations for older developers were intrinsic, including community identification, internal values, and altruism. This differs from younger developers who mentioned career benefits and learning as major motivating factors [6]. This shift in motivation is often caused by changing responsibilities, for example for family, which again cause conflicts with work-related demands such as working overtime or keeping up-to-date [7, 9].

As Comeau and Kemp report [7], in software development, being able to keep up to date and continuously learn is often linked to youth. Consequently, older developers are considered to be less adaptive to change. Furthermore, in the career path of developers, moving to a non-programming role is seen as a fundamental step. Consequently, expressing a wish to continue as a developer is associated with a lack of drive. Xia and Kleiner point to another perception of older developers, which is that they are more expensive due to higher pay and required medical support [8].

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4 https://www.un.org/en/sections/issues-depth/ageing/
Analyzing the Public Discourse

To analyze the public discourse on age and software development, we conducted a content analysis of online articles and discussions around those articles. In a first step, we retrieved the top 100 results for the search query “age software developer” using the Google Custom Search API. We searched for “software developer” and not only “software”, because we were interested in the people developing software, not software systems in general. Further, we added “age” instead of “old”, because we wanted to openly explore the discourse on age and software development without limiting ourselves to older developers from the beginning. For our search query, we configured the geolocation to be USA and the language to be English. We chose English, because most global online media targeting software development publish in English. To yield consistent search results regardless of our location, we configured the geolocation to be USA, not least because it is a large English-speaking country with a highly developed software industry. Moreover, the official US Labor Force Statistics reveal that the USA has a significant proportion of older developers in their workforce, with 10.7% of all developers in the age range 55 to 64 years and 3.1% in the range of 65 years and older (as of 2019) [4]. We executed the query with the above-mentioned configuration on August 2, 2019. The query results are available online together with our retrieval tool. The available data also links articles to their article ID (A1-A20), which we utilize in the following.

Starting with the most popular results (according to Google’s ranking), we followed all links and saved their content when the result was an online article either published on a news website (e.g., TechRepublic, CNBC, TechCrunch) or a blog (e.g., hosted on Medium or a personal website). Another requirement was that the articles had to contain at least some editorial content, and not just a collection of statistics or graphics. We also excluded online forum posts (many but small contributions), videos, (job) advertisements, and press releases.

We stopped after collecting 20 articles, because we noticed that the search results became less and less relevant for our goal, that is analyzing how age is described in the context of software development. Overall, we carefully assessed the top 63 search results and ignored the remaining 37. Figure 1 shows all headlines of the articles we analyzed.

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5 https://github.com/sbaltes/api-retriever#example-5-retrieve-top-100-results-for-google-search-queries
6 https://empirical-software.engineering/assets/data/google-search-results_us-en_2019-08-02_annotated.csv
7 https://github.com/sbaltes/api-retriever
8 E.g. https://www.daxx.com/blog/development-trends/number-software-developers-world
Figure 1: The twenty articles considered in this study

For the included articles, we extracted metadata about the authors and publication media together with all textual content. In multiple coding iterations, the three authors labeled the paragraphs of the articles independently while discussing the codes until agreeing on a common coding schema. The resulting schema captured different aspects of the public discourse on age and software development, including whose voices are reflected in the articles, whether age is described as being limiting, and which age-related aspects are reported. After finishing the coding, we observed that employability was a common theme throughout the articles. Therefore, two authors went over all articles again, focusing on suggested employability strategies for older developers - both from the perspective of an individual and from the perspective of companies. We collected and organized the identified strategies in a mind map (see Figure 2).

To not limit our view on the opinions captured in the online articles we analysed, we extended our data collection to online discussions around those articles. We selected Hacker News as our target platform, because it is a very popular social news website within the software development community where users can comment on linked articles and upvote them to be displayed more prominently on the platform.
We searched for the titles of all 20 articles on the Hacker News website and were able to identify ten discussions around six of those 20 articles. We then utilized the Hacker News API to retrieve all comments from the corresponding threads on February 24, 2020, resulting in a total of 1726 retrieved comments. Next we normalized the content of all comments as well as all article paragraphs related to the most frequently mentioned employability strategies, i.e., specialization (mentioned in four paragraphs), moving to a management role (five paragraphs), and mastering modern technologies (seven paragraphs). We tokenized the normalized comments and paragraphs into 3-grams and calculated their pairwise cosine similarity considering the BM15 weighting scheme. In the next step, we selected the five most similar comments for each paragraph, resulting in 85 paragraph-comment pairs. One of authors then coded 50 paragraphs, another one 48, such that 13 paragraphs have been coded by the two authors. The coders determined whether the comments agree or disagree with the articles.

Discussion and Lessons Learned

We started by collecting the authors’ definition for being an “old” software developer (see Table 1). Surprisingly, the most common definition was 40+ years, followed by 30+ years. One reason for the former definition may be the fact that 40 is also the threshold for protection under the US Age Discrimination in Employment Act. Still, even the highest number, 45+ years, if far away from a typical retirement age in industrialized countries. In scientific papers, “old” often refers to people of age 50 or older (see, e.g., [6]). Even though our sample size is relatively small, this strongly suggests a very biased notion of “age” or “being old” in the public discourse around age.

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9 https://www1.eeoc.gov/laws/types/age.cfm
and software development. Another interesting observation is captured in article A8, where the author lists 47 questions on Quora about being too old to become a software developer, ranging from age 14 to age 60. This further suggests that the fear of being too old to work in the software industry is common among a wide range of age groups.

Table 1: Age definitions in the articles

| An “old” software developer is... | Number of articles |
|----------------------------------|--------------------|
| 30+ years old                    | 4                  |
| 35+ years old                    | 3                  |
| 35-40+ years old                | 2                  |
| 40+ years old                    | 6                  |
| 45+ years old                    | 2                  |
| Not stated explicitly            | 3                  |

The most commonly suggested employability strategies for older developers were specialization, for example in software architecture or legacy code, moving to a management role, and mastering modern technologies. The latter two aspects were already discussed in related work [7]. In particular, the importance of mastering modern technologies is quite controversial among the developers on Hacker News: while some commenters indicate the importance of keeping up to date with technology development, others stress that learning new technology cannot counter the “cultural mismatch”. Developers were more in agreement with transition to management as a viable strategy: they see management as both “safe” and breaking the salary ceiling. We grouped those strategies, together with other rather obvious aspects such as diversifying skills and networking, into the high-level categories growing as a software engineer and changing the work environment (see Figure 2).

While those strategies come with their own challenges, in the following, we want to focus on novel aspects not yet covered in related work. First of all, the high-level category adapting expectation covers the spectrum of strategies based on the premise of “you’re old, get over it” (A5). The spectrum ranges from marketing your age as a plus over self-acceptance and lowering expectations in terms of salary, seniority level, and location, to retirement.

The second category we want to focus on in this article is appearing young, which captures controversial strategies such as modifying your résumé to disguise age-related aspects as well as undergoing plastic surgery to look younger, an aspect that has recently been picked up by major US news outlets.10 This category also captures adopting patterns of youthful behavior -

10 [https://www.washingtonpost.com/technology/2020/01/09/silicon-valley-some-men-say-cosmetic-procedures-are-essential-career/]
including *working overtime or during weekends* - strategies which are known to conflict with other responsibilities such as family [7, 9].

The above-mentioned strategies are centered around the individual developer. We did, however, also observe strategies related to *company culture and practices*. Some articles mentioned that companies should explicitly value both talent and experience. An extreme example for not following this advice negatively frames experience as “technology baggage” (A12, A17, A18). A positive strategy is presented in article A20, where the author reports on so-called “returnships” that help older developers to re-join software development after a career break. Unfortunately, most other strategies were negative examples of what companies may do to discourage older developers from joining or staying in the company. Beside not valuing experience (mentioned above), the language used in job postings and the often-related “startup culture” with its cultural norms and social events, together with an interview process focusing on content that recent graduates learned (see also [10]), all discourage older developers.

**Conclusion**

“Am I too old to be a developer” reverberates through different media involving software developers, from Quora posts to Hacker News, and from online magazines such as TechRepublic to scientific papers. In this study we have focused on the employability strategies recommended to “older” software developers. We have observed that already the interpretation of “old” is strongly biased in the public discourse around age and software development.

Online articles provide a plethora of recommendations on employability strategies. While moving to a management role, mastering modern technologies and specialization are most frequently mentioned, we also observe rather controversial strategies such as disguising age-related aspects in résumés or undergoing plastic surgeries to appear young, as well as strategies requiring developers to accept their age. Moreover, preserving employability cannot and should not solely be the burden of the developers themselves, companies should take their share of responsibility, curb practices negatively affecting older developers and encourage those welcoming developers of any age.

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