

Augmented Reality Through the Lens of the IP Landscape

Michael E. Adel Anne Le Turnier



Housekeeping

- This webinar is being recorded, you will receive a link to access it, in a follow-up email.
- If you have questions during the presentation, please send us via the Question Tab
- You can download the slides from the system
- At the end, you will get 4 short survey questions



Augmented Reality Through the Lens of the IP Landscape

Today's speakers



Michael E. Adel
Vice President of Intellectual
Property, Lumus



Anne Le Turnier
Director Business
Development, LexisNexis IP



Acknowledgments

I would like to thank:

- Dr. Sarbani Chattopadhyay of PatentSight for excellent application support.
- Mike Pellegrino of IP Analytix for insightful discussions.

- The narrative
- Where are we in the metaverse?
- Augmented Reality vs Augmented Reality Optics
- Patent landscape analysis
 - Time evolution, filing rates
 - Bubble charts
 - Rankings and distributions, Pareto & Zipf
 - Jurisdictions
- Summary

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The narrative

It's not just about the data, patent analytics must tell a story.

"For sale: baby shoes, never worn."

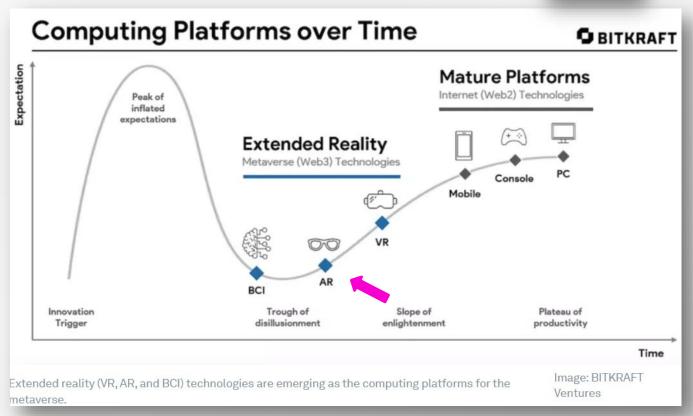
Ernest Hemingway



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Where are we in the metaverse?



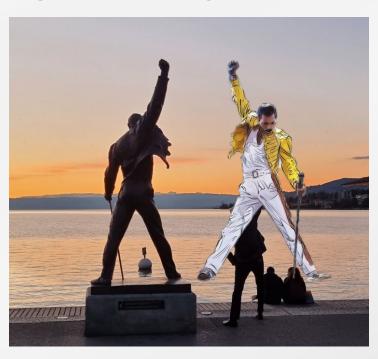


https://www.weforum.org/agenda/2022/02/future-of-the-metaverse-vr-ar-and-brain-computer/

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A tale of two landscapes

Augmented Reality:



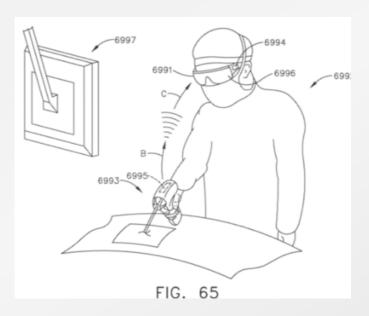
Augmented Reality Optics:



AR examples:

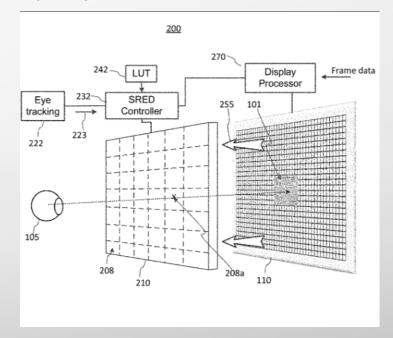
Johnson & Johnson: US11026751.B2

Display of alignment of staple cartridge to prior linear staple line.



Meta: US10636340.B2

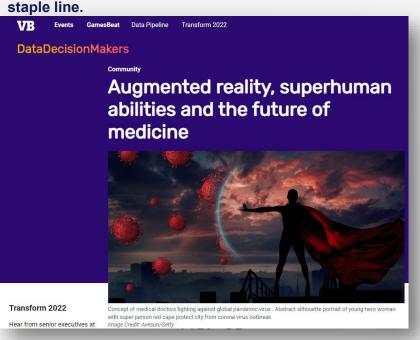
Display with gaze-adaptive resolution enhancement.

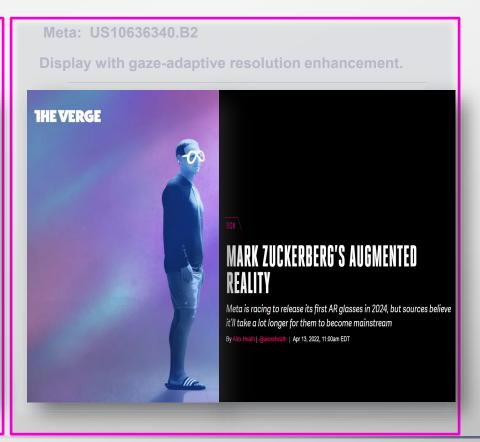


AR examples:

Johnson & Johnson: US11026751.B2

Display of alignment of staple cartridge to prior linear staple line.



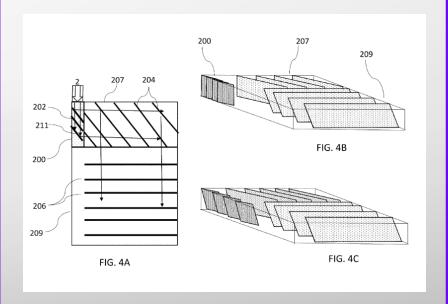


AR Optics examples:

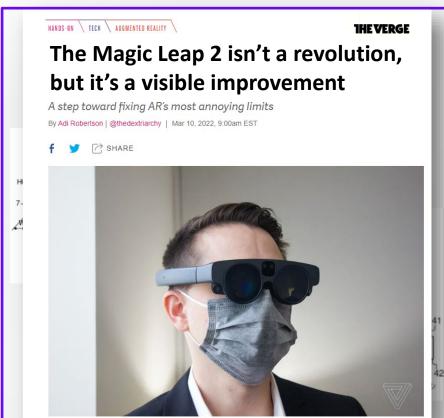
Magic Leap: US8160411.B2 Device for expanding an exit pupil in two dimensions 101 **(lunnul)** _B1 സസസസ

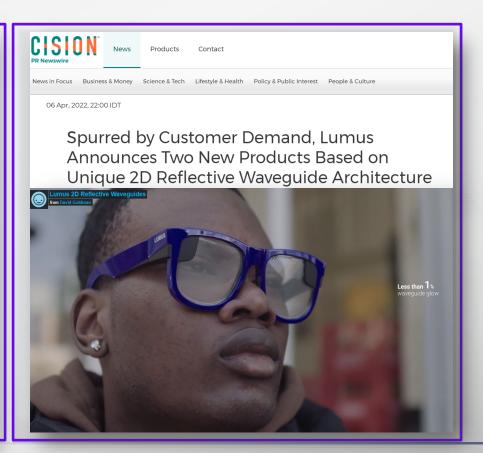
Lumus: US10983264 B2

Optical systems including light-guide optical elements with two-dimensional expansion

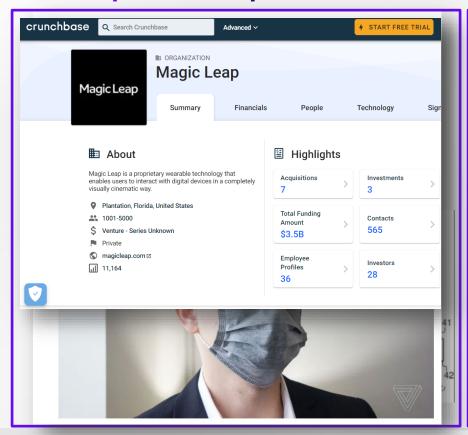


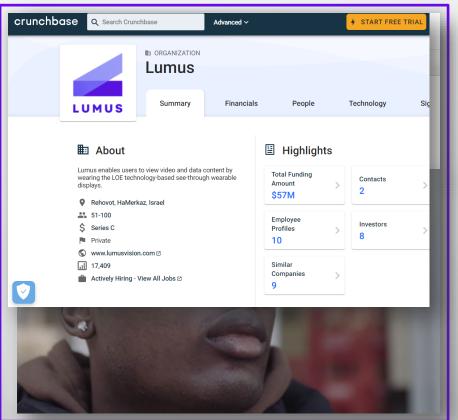
AR Optics examples:





AR Optics examples:





"All the News That's Fit to Print"

The New York Times

Late Edition

Today, morning clouds giving way to sunshine by the afternoon, high 65. Tonight, cloudy, low 54. Tomorrow, clouds giving way to sunshine, high 70. Weather map is on Page 23.

VOL. CLXIX ... No. 58,703

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NEW YORK, SUNDAY, MAY 24, 2020

\$6.00

U.S. DEATHS NEAR 100,000, AN INCALCULABLE LOSS

They Were Not Simply Names on a List. They Were Us.

Numbers alone cannot possibly measure the impact of the coronavirus on America, whether it is the number of patients treated, jobs interrupted or lives cut short. As the country nears a grim milestone of 100,000 deaths attributed to the virus, The New York Times scoured obituaries and death notices of the victims. The 1,000 people here reflect just 1 percent of the toll. None were mere numbers.

Patricia Dowd, 57, San Jose, Calif., auditor in Silicon Valley • Marion Krueger, 85, Kirkland, Wash., greatgrandmother with an easy laugh • Jermaine Ferro, 77, Lee County, Fla, wife with little time to enjoy a new marriage • Cornelius Lawyer, 84, Belevue, Wash., sharecropper's son • Loretta Mendoza Dionisio, 68, Los Angeles. cancer survivor born in the Phil-

real jokester · Michael Sorkin, 71, New York City, champion of social justice through architecture · George Valentine, 66, Washington, D.C., lawyer who mentored others · James Quigley, 77, Chicago, rebel of the family · Sherman Pittman, 61, Chicago, dedicated his life to his church and his neighborhood . Susan McPherson Gottsegen, 74, Palm Beach, Fla., loyal and generous friend to many · Andreas Koutsoudakis, 59, New York City, trailblazer for TriBe-Ca · Bob Barnum, 64, St. Petersburg, Fla., leader in Florida Pride events . Noel Sinkiat, 64, Olney, Md., nurse planning for retirement . Thomas E. Anglin, 85, Cumming, Ga., created many wonderful memories for his family · Robert Manley Argo Jr., 75, South Bay, Calif., member of Del Amo Flyers · Michael McKinnell, 84, Beverly, Mass., architect of Boston's monumental City Hall · Huguette Dorsey, 94, Somerville, N.J., coached several championship-winning junior high girls basketball teams · Lynne Sierra, 68, Roselle, Ill., grandmother who was always full of ideas · Louvenia Henderson, 44, Tonawanda, N.Y., proud single mother of three · Carol Sue Rubin, 69, West Bloomfield, Mich., loved travel, mahiong and crossword

jazz trumpet virtuoso · Cristina, 64, New York City, downtown New York singer with a cult following . Robert H. Westphal, 75, Fond du Lac, Wis., statesman in the construction industry · Clair Dunlap, 89, Washington, pilot still teaching people to fly at 88 . Marylou Armer, 43, Sonoma Valley, Calif., veteran police detective · Regina D. Cullen, 81, Shrewsbury, Mass., small in stature but strong in spirit . Sandra Santos-Vizcaino, 54, New York City, beloved public school teacher · Frank Gabrin, 60, New York City, emergency room doctor who died in husband's arms . Sterling E. Matthews, 60, Midlothian, Va., cancer survivor who served as a deacon · Alby Kass, 89, California, lead singer of a Yiddish folk group · Roger Eckart, 78, Indiana, retired firefighter and old-school barber Martin Douglas, 71, New York City. maestro of a steel-pan band . Daniel Spector, 68, Memphis, mentor to other Memphis artists · Mary Minervini, 91, Oak Lawn, Ill., sign-language interpreter · Salomon S. Podgursky, 84, Morristown, N.J., loved to figure out how things worked . Dale E. Thurman, 65, Lexington, Ky., tailor known for his exacting work and strong opinions · Ellis Marsalis, 85, New Orleans,

Bailargeon, 72, Dennisport, Mass., true outdoorsman · Viraf Darukhanawalla, 77, Hoffman Estates, Ill., worker at O'Hare International Airport · Chester Dwulet, 68, Burlington, Mass., proud Union Ironworker of Local 7 for 45 years · John Timothy Barr. 76. Rochester Hills, Mich., trustee for the Retired Detroit Police and Firefighters Association · Julie Butler, 62, New York City, veterinarian who served Harlem · Lila A. Fenwick, 87, New York City, first black woman to graduate from Harvard Law School · Vincent Lionti, 60, New York City, Met Opera violist and youth orchestra conductor · Ann Youngerman Smoler, 87, New York City, had a passion for social justice · Thomas Waters, 56, New York City, armed the affordable housing movement with data and analysis Luke Workoff, 33, Huntington, N.Y., his relentless passion was for his family and friends · José Díaz-Avala, 38, Palm Beach, Fla., served with the Palm Beach County Sheriff's Office for 14 years · Antonio Nieves, 73, Chicago, always seemed to be busy with some home project · Jeanne Hammond Byrnes, 97, Danbury, Conn., received numerous awards for her accounting skills . Alice Coopersmith spirit · Jack Butler, 78, Indiana, lived in the house he grew up in . Susan Grey Hopp Crofoot, 97, Westwood, N.J., took great joy in writing little ditties under her pen name, Penelope Penwiper · James David Gewirtzman, 72, New City, N.Y., spent some of his happiest hours hiking in the Adirondacks Henry F. Graff, 98, Greenwich, Conn., Columbia University historian of U.S. presidents · Mari Jo Davitto, 82, Thornton, Ill., people were her hobby Yaakov Perlow, 89, New York City. leader of the Novominsker Hasidic dynasty · Joseph F. Kelly, 81, New York City, did two tours through the Panama Canal to Antarctica · John Prine. 73, Nashville, country-folk singer who was a favorite of Bob Dylan · Perry Buchalter, 63, Florida, quiet hero . Monica Maley, 74, Rehoboth Beach, Del., loved animals, had dogs and cats, and rode horses . Thomas Tarbell Russell, 83, Longmeadow, Mass., mentored by the computer science pioneer Grace Hopper · Ruth Skapinok, 85, Roseville, Calif., backyard birds were known to eat from her hand . Faralyn Havir, 92, Minnesota, her favorite thing was meeting new people . Torrin Jamal Howard, 26, Waterbury, Conn., gentle giant, athlete and musiII. 69. Fremont, Ohio, known throughout Ohio for his knowledge of local history · Harley E. Acker, 79, Troupsburg, N.Y., discovered his true calling when he started driving a school bus . Arlola Rawls, 81, Chicago, caretaker of her neighborhood · Roger Liddell, 65, Flint, Mich., brought smiles to everyone he interacted with . Luther Coleman, 108, Evergreen Park, Ill., man who seemed to know everything . Denise Camille Buczek, 72, Bristol, Conn., loved writing birthday and holiday cards, poems and lists · Charles Constantino, 86, Menlo Park, N.J., worked 40 years for The New York Times . Ben Doherty, 83, Boston, stockbroker who founded Doherty Financial Services · John Horton Conway, 82, New Brunswick, N.J., mathematician known as the "magical genius" . Stanley Chera, 77, New York City, developer and friend of the president · Robby Browne, 72, New York City, Realtor and philanthropist who socialized with celebrities · Wynn Handman, 97, New York City, acting teacher and a founder of the American Place Theater . Adam Kovacs, 72, New York City, cartoonist and an expert on musicals . Peter Brown, 53, New Jersey, manager of the S.W. Brown & Son Funeral

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Search criteria:

AR

(((IPC=(G06F 111/18) OR CPCOriginal=(G06F2111/18)) AND TitleAbstractClaims=(augmented*)) OR CPCOriginal=(A61B2019/5291, A61B2090/365, B60K2370/177, G02B 27/01, G05B2219/32014, G05B2219/39451, G06K 9/00671, H04M2203/359, H04N2201/3245) OR IPC=(G02B 27/01) OR TitleAbstractClaims=((augmented, mixed) NEAR (realit*))

AR Optics

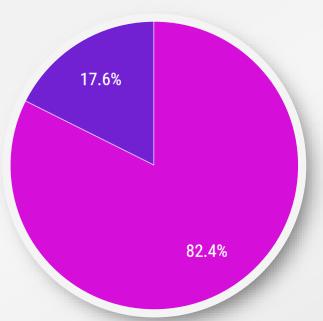
(CPC=(G02B 27/01) OR IPC=(G02B 27/01)) AND TitleAbstractClaims=(optical device or waveguide or lightguide)

CPC/IPC G02B 27/01 = head-up display

Pie chart of AR Optics in AR

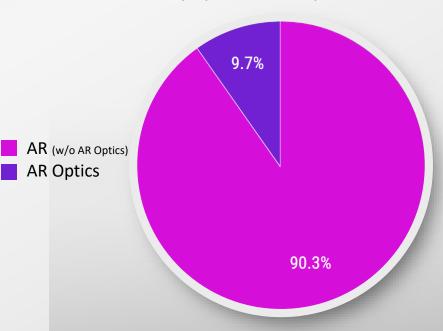
Patent Asset IndexTM

Pie chart of proportion of AR Optics in AR



Portfolio size

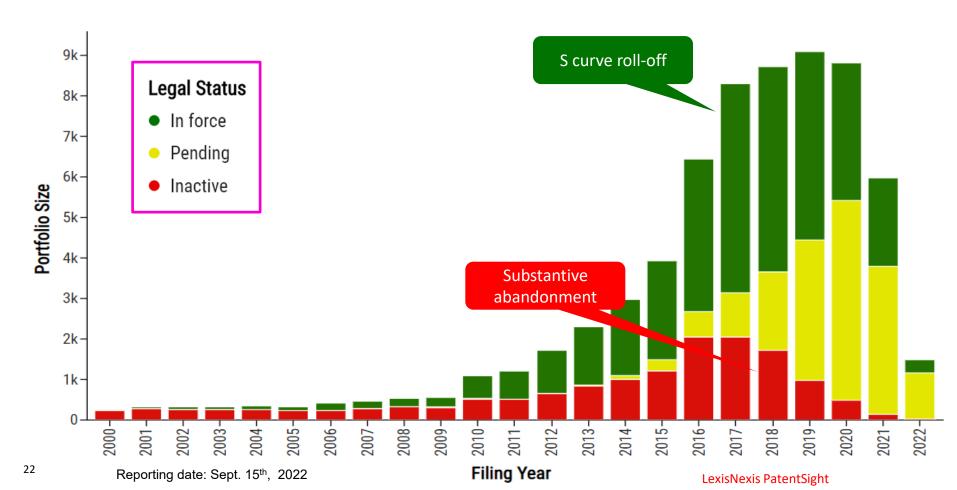
Pie chart of proportion of AR Optics in AR



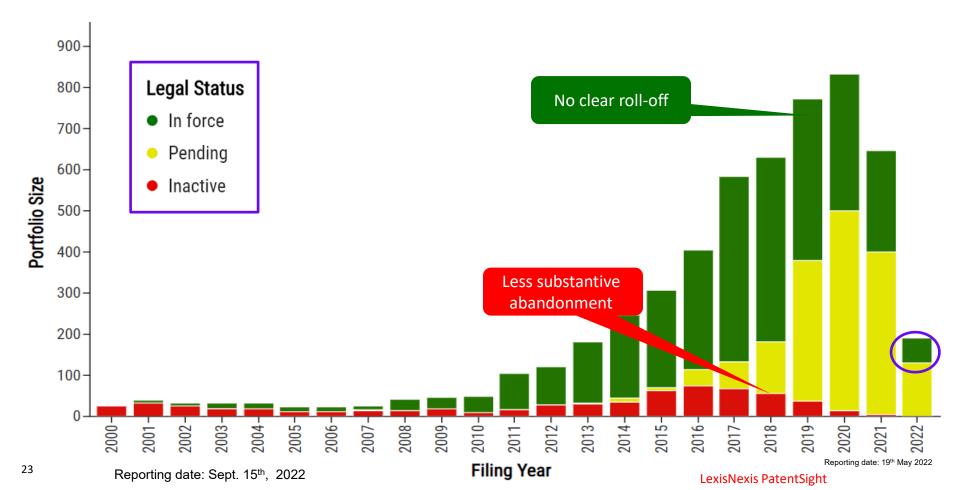
Reporting date: May 19th, 2022

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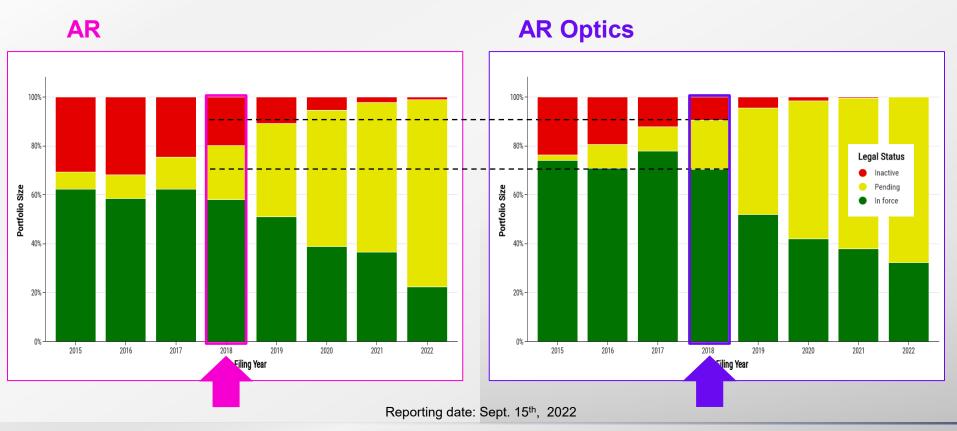
AR patent landscape filing stats by current legal status



AR Optics patent landscape filing stats by current legal status



AR indicates higher abandonment and lower allowance rates than AR Optics



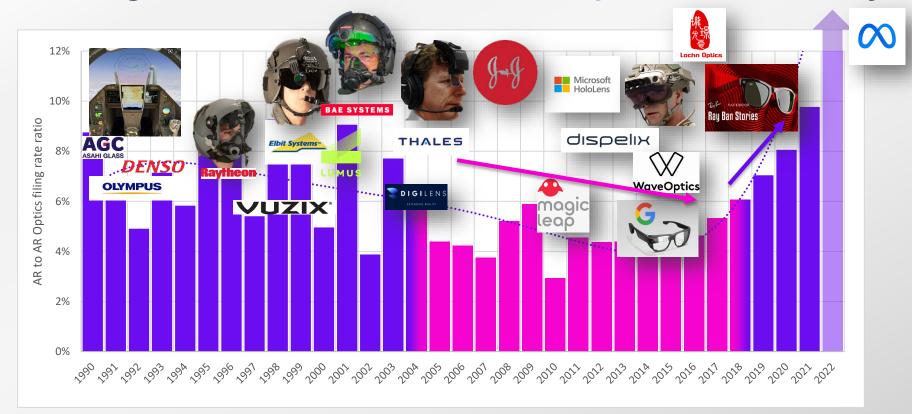
USPTO rejection analysis, AR vs AR Optics

AR			AR Optics				
Rejection Type	Occurrence Per Application	Relative Performance		Rejection Type	Occurrence Per Application	Relative Performance	
Non-final Rejections	1.10	Average		Non-final Rejections	0.96	Better than average	
Final Rejections	0.55	Worse than average		Final Rejections	0.41	Average	
Total Rejections	1.65	Worse than average		Total Rejections	1.37	Better than average	
§101 Rejections	0.52	Poor		§101 Rejections	0.05	Better than average	
§102 Rejections	0.84	Among the best		§102 Rejections	0.99	Better than average	
§103 Rejections	10.46	Poor		§103 Rejections	9.08	Worse than average	
§112 Rejections	0.58	Better than average		§112 Rejections	0.50	Among the best	

ASSIGNEE DASHBOARD

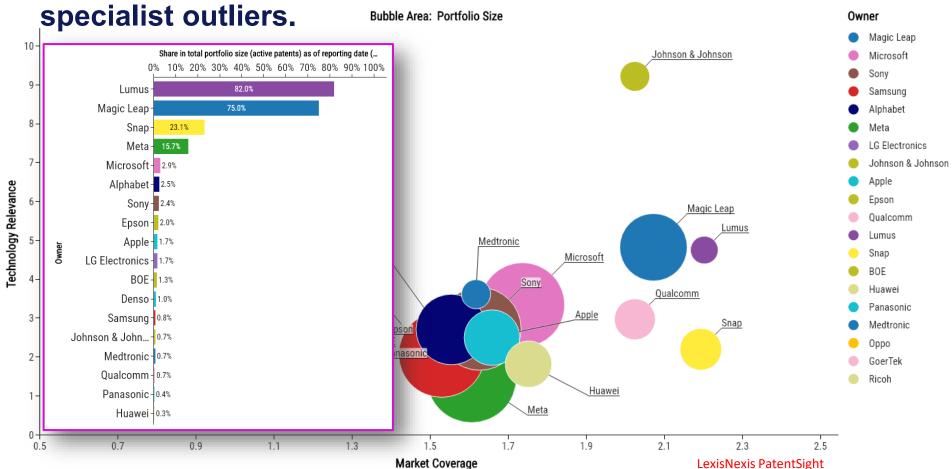


The filing rate ratio between AR & AR optics tells the story

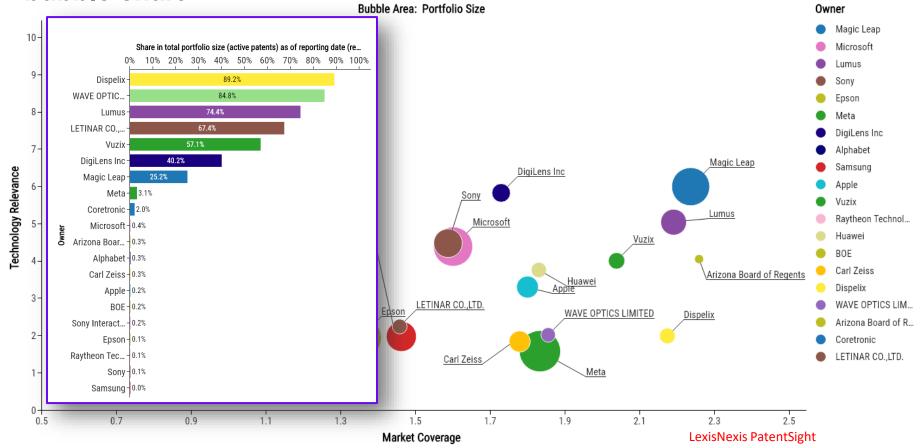


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The AR bubble chart shows a major player cluster and

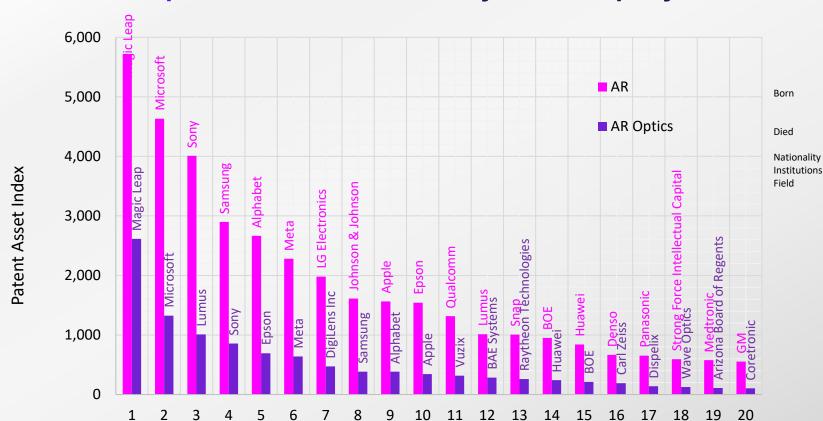


Magic Leap, Lumus and Digilens stand out in the AR Optics bubble chart.



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The AR Optics ranked Pareto decays more rapidly than AR.

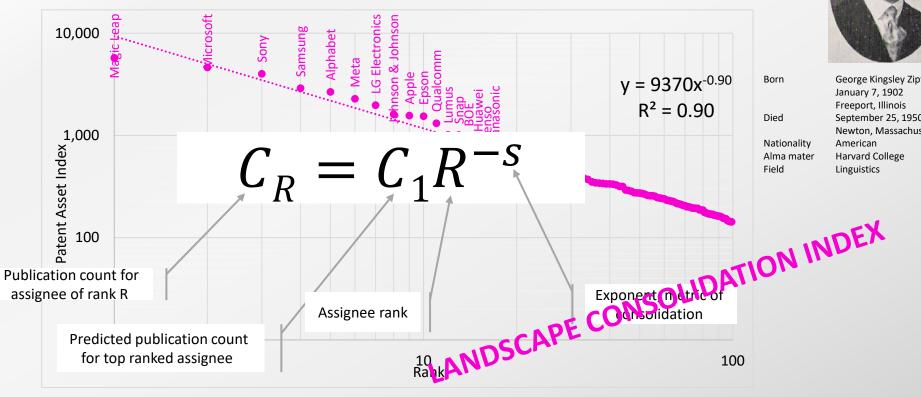




Wilfried Fritz Pareto 15 July 1848 Paris, France 19 August 1923 Céligny, Switzerland Italian University of Lausanne **Economics**

Born

A ranked Pareto on a log log plot is called a Zipf plot.





George Kingsley Zipf January 7, 1902 Freeport, Illinois September 25, 1950 Newton, Massachusetts American Harvard College Linguistics

Born

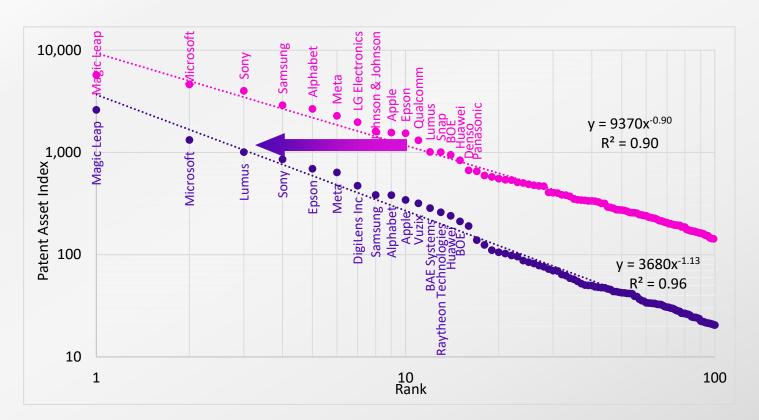
Died

Field

Nationality

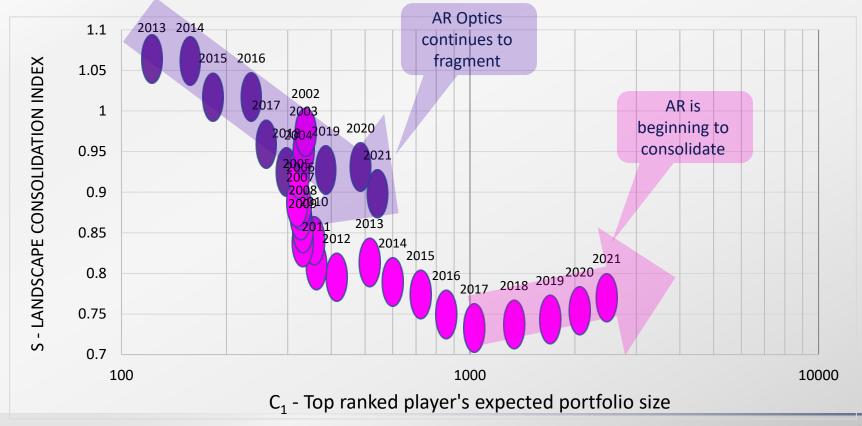
Alma mater

Lumus moves from 12th to 3rd place in AR optics ranking



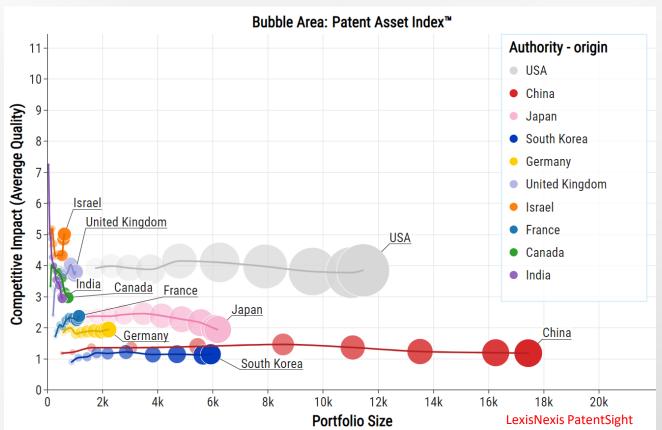


While AR consolidates, the AR Optics portfolio fragments.



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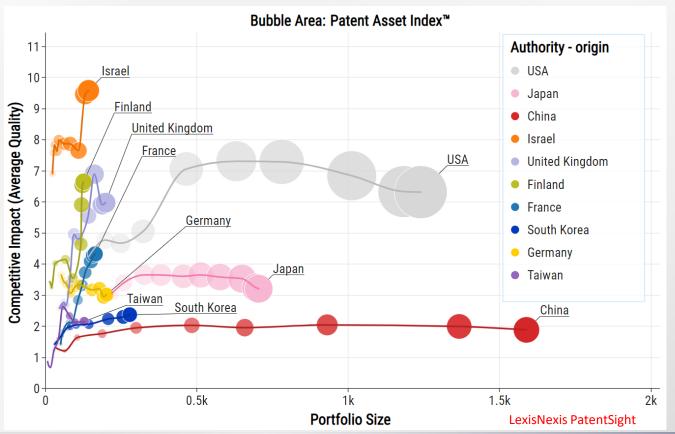
AR by inventor origin



Average Quality vs Quantity of patent families with inventor address in corresponding authorities.

Ranking by Patent Asset Index of patent families.

AR Optics by inventor origin



Average Quality vs Quantity of patent families with inventor address in corresponding authorities.

Ranking by Patent Asset Index of patent families

Summary – key take aways

• Patent analytics has to tell a story.



- AR is crawling out of the *trough of disillusionment*.
- AR optics filings are growing faster than AR.
- While the AR portfolio consolidates, AR optics continues to fragment.
- Lumus punches above their weight in AR, & AR optics in particular.
- AR optics is the rate limiting enabler for consumer AR products.

Questions



Thank you for your interest!





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Connect on LinkedIn